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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY.DOCKET NO./TITLE	REQUEST ID
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	115219

Acknowledgement of Change to Small Entity Status

The entity status change request below filed through Private PAIR on 06/25/2020 has been accepted.

CERTIFICATIONS:

Change of Entity Status:

X Applicant asserting small entity status. See 37 CFR 1.27.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Gregory L. Porter/
Name:	Gregory L. Porter
Registration Number:	40131

UNITED STATES PATENT AND TRADEMARK OFFICE

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Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	12/11/2018	10153483	DENA-0008 (223156)	1004

130577 7590 11/20/2018

ANDREWS KURTH KENYON LLP
600 Travis Street
Suite 4200
Houston, TX 77002

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 792 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Clive P. Bosnyak, Dripping Springs, TX;
Kurt W. Swogger, Austin, TX;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

130577 7590 08/27/2018
ANDREWS KURTH KENYON LLP
600 Travis Street
Suite 4200
Houston, TX 77002

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

TITLE OF INVENTION: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	11/27/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
STUCKEY, PHILIP A	1723	429-220000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Stephen P. Krupp
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Molecular Rebar Design, LLC

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Austin, TX USA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ☒ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

☒ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

☒ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 50-2849 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

☒ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Gregory L. Porter/ Date 2018-10-31

Typed or printed name Gregory L. Porter Registration No. 40131

Electronic Patent Application Fee Transmittal	
Application Number:	13529797
Filing Date:	21-Jun-2012
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Filer:	Gregory L. Porter/Jeanne Dunn
Attorney Docket Number:	DENA-0008 (223156)

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1000**

Electronic Acknowledgement Receipt	
EFS ID:	34178085
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	31-OCT-2018
Filing Date:	21-JUN-2012
Time Stamp:	17:23:08
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1000
RAM confirmation Number	110118INTEFSW00004407502849
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IssueFeeTransmittal.pdf	87740 60cea3a8a70b58f66bfa1aae6215b73e2600d973	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30454 daf0545dcfd8b00acf7eea2edb3a6ddea6d9db35	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	118194		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

130577 7590 08/27/2018

ANDREWS KURTH KENYON LLP
600 Travis Street
Suite 4200
Houston, TX 77002

EXAMINER
STUCKEY, PHILIP A

ART UNIT	PAPER NUMBER
1723	

DATE MAILED: 08/27/2018

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

TITLE OF INVENTION: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	11/27/2018

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

130577 7590 08/27/2018
ANDREWS KURTH KENYON LLP
600 Travis Street
Suite 4200
Houston, TX 77002

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

TITLE OF INVENTION: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	11/27/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
STUCKEY, PHILIP A	1723	429-220000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 08/27/2018

ANDREWS KURTH KENYON LLP
600 Travis Street
Suite 4200
Houston, TX 77002

EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

DATE MAILED: 08/27/2018

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	**Application No.** 13/529,797	**Applicant(s)** Bosnyak et al.	
	Examiner Philip A Stuckey, PhD	**Art Unit** 1723	**AIA Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 6/22/2018.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-4,6-7 and 10-21 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/PHILIP A. STUCKEY/ Examiner, Art Unit 1723	/MILTON I CANO/ Supervisory Patent Examiner, Art Unit 1723

Notice of Allowance

Claims 1-4, 6, 7, and 10-21 are allowed.

Election/Restrictions

This application is in condition for allowance except for the presence of claims 8 and 9 directed to a process non-elected without traverse. Accordingly, claims 8 and 9 been cancelled.

Terminal Disclaimer

The terminal disclaimers filed on January 24, 2017 and March 20, 2017 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of Patents no. 8,808,909 and 9,968,924 respectively have been reviewed and is accepted. The terminal disclaimers have been recorded.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip A. Stuckey, PhD whose telephone number is (571)272-9875. The examiner can normally be reached on 8:30-5:00 EST Monday - Friday.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton I. Cano can be reached on (571)272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PHILIP A. STUCKEY/
Examiner, Art Unit 1723

/MILTON I CANO/
Supervisory Patent Examiner
Art Unit 1723

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13/529,797	Bosnyak et al.
	Examiner	**Art Unit**
	Philip A Stuckey, PhD	1723

CPC						
Symbol					**Type**	**Version**
H01M	/	4	/	366	F	2013-01-01
H01M	/	4	/	131	I	2013-01-01
H01M	/	4	/	133	I	2013-01-01
H01M	/	4	/	134	I	2013-01-01
H01M	/	4	/	1391	I	2013-01-01
H01M	/	4	/	1393	I	2013-01-01
H01M	/	4	/	1395	I	2013-01-01
H01M	/	4	/	505	I	2013-01-01
H01M	/	4	/	525	I	2013-01-01
H01M	/	4	/	625	I	2013-01-01
H01M	/	10	/	0525	I	2013-01-01
H01M	/	4	/	587	I	2013-01-01
H01M	/	4	/	0416	I	2013-01-01
H01M	/	6	/	00	I	2013-01-01
Y02E	/	60	/	122	A	2013-01-01
B82Y	/	99	/	00	A	2013-01-01
Y10S	/	977	/	742	A	2013-01-01
Y10S	/	977	/	948	A	2013-01-01
B82Y	/	30	/	00	A	2013-01-01
H01M	/	2004	/	027	A	2013-01-01
Y02P	/	70	/	54	A	2015-11-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

/PHILIP A. STUCKEY/ Examiner, Art Unit 1723	01 August 2018	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	18	
/MILTON I CANO/ SPE, Art Unit 1723	01 August 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

U.S. Patent and Trademark Office — Part of Paper No.: 20180801

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13/529,797	Bosnyak et al.
	Examiner	**Art Unit**
	Philip A Stuckey, PhD	1723

INTERNATIONAL CLASSIFICATION				
CLAIMED				
H01M	/	4	/	38

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

/PHILIP A. STUCKEY/ Examiner, Art Unit 1723	01 August 2018	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	18	
/MILTON I CANO/ SPE, Art Unit 1723	01 August 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

U.S. Patent and Trademark Office — Part of Paper No.: 20180801

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13/529,797	Bosnyak et al.
	Examiner	**Art Unit**
	Philip A Stuckey, PhD	1723

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	13												
2	2	11	14												
3	3	12	15												
4	4	13	16												
5	6	14	17												
6	7	15	18												
7	10	16	19												
8	11	17	20												
9	12	18	21												

/PHILIP A. STUCKEY/ Examiner, Art Unit 1723	01 August 2018	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	18	
/MILTON I CANO/ SPE, Art Unit 1723	01 August 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

U.S. Patent and Trademark Office — Part of Paper No.: 20180801

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13/529,797	Bosnyak et al.
	Examiner	Art Unit
	Philip A Stuckey, PhD	1723

CPC - Searched*		
Symbol	**Date**	**Examiner**
H01M 4/587	07/09/2014	EMC
H01M 4/525 4/505	11 March 2015, 2/1/16, 8/5/2016	PS
H01M 4/366 6/00 4/0416 4/587 4/625 4/525 4/505 4/1391 4/1393 10/0525 4/134 4/133 4/131 4/1395 2004/027	08/01/2018	PS
Y02P 70/54	08/01/2018	PS
B82Y 30/00 99/00	08/01/2018	PS
Y10S 977/948 977/742	08/01/2018	PS
Y02E 60/122	08/01/2018	PS

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
429	231.8	06/24/2014	EMC

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

	/PHILIP A STUCKEY/ Examiner.Art Unit 1723

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13/529,797	Bosnyak et al.
	Examiner	Art Unit
	Philip A Stuckey, PhD	1723

Search Notes		
Search Notes	**Date**	**Examiner**
429 Consultation with Nicholas D'Aniello	06/24/2014	EMC
429 Consultation with Brian Talbot	07/09/2014	EMC
Inventor Search in PALM	06/24/2014	EMC
Assignee Search in EAST	06/24/2014	EMC
Application 14/128392 History and Search Reviewed	06/24/2014	EMC
EAST Keyword Search	06/24/2014	EMC
Inventor search in PALM	11 March 15, 2/1/16, 8/5 /2016	PS
EAST search History Report	11 March 15, 2/1/16, 8/5 /2016	PS
Consulted Milton Cano	11 March 15, 1/21/16	PS
NPL Google search: lithium ion battery solvent additives carbon nanotube LiFePO4	11 March 15	PS
Consulted Nick D'Aneillo	12 March 15, 8/4/2106	PS
EAST search History Report	08/01/2018	PS
Inventor search in PALM	08/01/2018	PS

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
H01M	4/366 6/00 4/0416 4/587 4/625 4/525 4/505 4/1391 4/ 1393 10/0525 4/134 4/133 4/131 4/1395 2004/027	08/01/2018	PS
Y02P	70/54	08/01/2018	PS
B82Y	30/00 99/00	08/01/2018	PS
Y10S	977/948 977/742	08/01/2018	PS
Y02E	60/122	08/01/2018	PS

	/PHILIP A STUCKEY/ Examiner.Art Unit 1723

Bibliographic Data

Application No: 13/529,797

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /Philip Stuckey/ (Examiner's Signature) | (Initials)

Title: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
06/21/2012	429	1723	DENA-0008 (223156)
RULE			

APPLICANTS

INVENTORS

Clive P. Bosnyak Dripping Springs, TX, UNITED STATES

Kurt W. Swogger Austin, TX, UNITED STATES

CONTINUING DATA

This application has PRO of 61500560 06/23/2011

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

07/20/2012

** SMALL ENTITY **

STATE OR COUNTRY

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Suite 4200
Houston, TX 77002
UNITED STATES

FILING FEE RECEIVED

$905

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	320352	(H01M4/366 or H01M6/00 or H01M4/0416 or H01M4/587 or H01M4/625 or H01M4/525 or H01M4/505 or H01M4/1391 or H01M4/1393 or H01M10/0525 or H01M4/134 or H01M4/133 or H01M4/131 or H01M4/1395 or Y02P70/54 or H01M2004/027 or B82Y30/00 or B82Y99/00 or Y10S977/948 or Y10S977/742 or Y02E60/122).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/01 15:16
L6	2	1 and (discrete and (non-agglomerated non adj agglomerated) and exfoliated)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/01 15:23
L7	13406	1 and (discrete (non-agglomerated non adj agglomerated) exfoliated)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/01 15:23
L10	0	1 and (discrete (non-agglomerated or non adj agglomerated) exfoliated)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2018/08/01 15:24
L14	267	1 and ((discrete and exfoliated) and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/01 15:28
L15	39	1 and ((discrete and exfoliated) with (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/01 15:28
L17	17	1 and ((discrete with exfoliated) with (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2018/08/01 15:29

			DERWENT; IBM_TDB			
S1	1	"20120328946".pn.	US-PGPUB; USPAT	OR	ON	2015/03/04 19:50
S2	18107	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S3	16328	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S4	12562	S2 and S3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S5	371	S4 and carbon near4 nanotube	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:56
S6	43	S5 and ratio with lithium with ion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:56
S7	7	("20110104551" | "20110311876" | "20110311876" | "20100159331").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 11:39
S8	3	("20110104551" | "20110311876" | "20110311876" | "20100159331").PN.	US-PGPUB; USPAT	OR	ON	2015/03/11 11:39
S9	18138	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S10	16364	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2015/03/11 15:35

			DERWENT; IBM_TDB			
S11	12592	S9 and S10	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S12	21	S11 and carbon near4 nanotube with (weight "wt" "wt%" "wt %")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S13	6	S12 and ratio with lithium with ion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:36
S14	9	S12 and carbon near4 nanotube with (weight "wt" "wt%" "wt %") and aspect near3 ratio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 20:43
S15	6	S12 and carbon near4 nanotube with (weight "wt" "wt%" "wt %") and aspect near3 ratio and graphene	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 20:43
S16	22	carbon near4 nanotube with oxidation near2 level	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:19
S17	5	S11 and S16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:19
S18	17	S16 not S17	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:20
S19	11	S11 and carbon near4 nanotube with function$7	US-PGPUB; USPAT; USOCR;	OR	ON	2015/03/11 21:22

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S20	15	S11 and carbon near4 nanotube same function$7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:23
S21	4	S20 not S19	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:23
S22	464164	H01M$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:24
S23	632	S22 and carbon near4 nanotube with function$7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:24
S24	35	carbon near4 nanotube same oxidation near2 level	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:25
S25	18	S22 and S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:25
S26	5	S11 and S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:26
S30	1	"7070753".pn.	US-PGPUB; USPAT	OR	ON	2015/03/11 21:33
S31	5	S12 and carbon near4 nanotube with lithium near5 salt	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2015/03/11 22:35

			IBM_TDB			
S32	35	S22 and carbon near4 nanotube with lithium near5 salt	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:36
S33	6	S22 and carbon near4 nanotube with lithium near5 salt with weight	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:36
S34	29	S22 and carbon near4 nanotube same lithium near5 salt same (weight ratio)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:39
S35	5	S12 and carbon near4 nanotube same lithium near5 salt same (weight ratio)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:39
S40	5	("20110104551" | "7070753" | "20110311876" | "20110311876" | "20100176337" | "20100159331").PN.	US-PGPUB; USPAT	OR	ON	2016/01/21 18:06
S42	3	("8808909" "8968924" "9065132").PN.	US-PGPUB; USPAT	OR	ON	2016/01/22 08:21
S43	15	"25335609".FMID.	US-PGPUB; USPAT; FPRS	OR	ON	2016/01/28 16:59
S44	21649	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:12
S45	19710	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:12
S47	25934	S44 S45	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:12
S48	15	S47 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon	US-PGPUB; USPAT;	OR	ON	2016/02/01 14:43

		near4 nanotube) same (ionic$6) and ("LiMnPO.sub.4" "Li.sub.3MnPO.sub.4")	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S49	1280	"LiMnPO.sub.4" and H01M$	US-PGPUB; USPAT	OR	ON	2016/02/01 14:43
S50	24	S49 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6) and ("LiMnPO.sub.4" "Li.sub.3MnPO.sub.4")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:44
S51	15	S50 not S48	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:44
S54	29	S49 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) and ("LiMnPO.sub.4" lithium near4 manganese near4 phosphate)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:49
S55	25	S49 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same3 (active near3 material)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:52
S56	17	S47 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) and ("LiMnPO.sub.4" lithium near4 manganese near4 phosphate)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:52
S57	91	S47 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:54
S58	82	S47 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:55
S59	57	S47 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same (bond$4 attach$4) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2016/02/01 14:56

			DERWENT; IBM_TDB			
S60	117	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same (bond$4 attach$4) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 15:00
S61	26	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same (bond$4 attach$4) same2 (active near3 material) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 15:01
S62	61	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$4) same2 (active near3 material) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 15:07
S63	2	("20050006623" | "6114068").PN.	US-PGPUB; USPAT	OR	ON	2016/08/05 12:39
S64	22036	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
S65	20071	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
S66	26323	S64 S65	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
S67	14	S66 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6) and ("LiMnPO.sub.4" "Li.sub.3MnPO.sub.4")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
S68	1468	"LiMnPO.sub.4" and H01M$	US-PGPUB; USPAT	OR	ON	2016/08/05 15:51
S69	25	S68 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6) and ("LiMnPO.sub.4" "Li.sub.3MnPO.sub.4")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2016/08/05 15:51

			DERWENT; IBM_TDB			
S70	17	S69 not S67	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
S71	29	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same (bond$4 attach$4) same2 (active near3 material) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 06/22/2018
ANDREWS KURTH KENYON LLP
600 Travis Street
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Houston, TX 77002

EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
06/22/2018	ELECTRONIC

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CLIVE P. BOSNYAK and KURT W. SWOGGER

Appeal 2017-008091
Application 13/529,797
Technology Center 1700

Before AVELYN M. ROSS, BRIAN D. RANGE, and
DEBRA L. DENNETT, *Administrative Patent Judges*.

ROSS, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

Appellants[2] appeal under 35 U.S.C. § 134(a) from a rejection of claims 1–4, 6–7, and 10–21. We have jurisdiction under 35 U.S.C. § 6(b). An oral hearing was held on June 14, 2018.[3]

We REVERSE.

STATEMENT OF THE CASE

The subject matter on appeal relates to a lithium ion batteries using discrete carbon nanotubes, methods for production thereof and products obtained therefrom. Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A composition useful for lithium ion batteries comprising: discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active material ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of

[1] In our Decision we refer to the Specification filed June 21, 2012 as amended September 24, 2015 ("Spec."), the Final Office Action appealed from dated August 19, 2016 ("Final Act."), the Appeal Brief filed January 24, 2017 ("Appeal Br."), the Examiner's Answer dated March 10, 2017 ("Ans.") and the Reply Brief filed May 9, 2017 ("Reply Br.").

[2] Appellants identify the real party in interest as Molecular Rebar Design, LLC. Appeal Br. 2. Appellants also state "[a]nother interested party is licensee Black Diamond Structures, LLC which is a joint venture between Molecular Rebar Design, LLC and SABIC." *Id.*

[3] A written transcript of the oral hearing will be entered into the record when the transcript is made available.

> carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

Appeal Br. 17 (Claims App'x).

REJECTIONS

The Examiner maintains the following rejections[4]:

A. Claims 1–4 and 10–21 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Li in view of Niu. Final Act. 5–6.

B. Claims 6 and 7 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Li in view of Niu and in further view of Zhamu. *Id.* at 18.

Appellants seek our reversal of Rejections A–B. Appeal Br. 8. Appellants argue rejections A and B together, and argue independent claims 1, 10, 11, and 12 as a group. *See id.* Because the basis for our reversal—i.e., Li fails to teach "discrete, non-agglomerated, and exfoliated carbon nanotubes" as claimed—is common to all claims[5], we focus our discussion of the prior art rejections on claim 1.

---

[4] The Examiner withdraws the nonstatutory double patenting rejection over US 8,808,909. Ans. 3. Appellants filed a terminal disclaimer on March 10, 2017, disclaiming the terminal portion of this application which would extend beyond the expiration date of US 8,968,924 ("the '924 patent). Therefore, the nonstatutory double patenting rejection over the '924 patent is moot. *See* Terminal Disclaimer dated March 10, 2017.

[5] Claim 12 relates to "uniformly dispersible oxidized, non-agglomerated, and exfoliated carbon nanotubes." Appeal Br. 19 (Claims App'x).

OPINION

The Examiner rejects claim 1 (among others) as obvious over Li in view of Niu. Final Act. 6. Relevant to claim 1, the Examiner finds that Li teaches all aspects of claim 1, except that Li "does not teach the oxidized species, aspect ratio, and oxidation level of the carbon nanotubes." *Id.* at 7. But, the Examiner finds that Niu similarly teaches disassembled discrete carbon nanotubes that have "an aspect ratio of 5 or greater" and "the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities."[6] *Id.* The Examiner reasons that one skilled in the art would have selected the claimed oxidized species of carbon nanotubes "because Niu discloses that an increase in oxygen content can also improve density of the material" and further, that the aspect ratio taught by Niu would be desired "for binding the materials in the electrode." *Id.* The Examiner further determines that "the ionically attached surface of discrete carbon nanotubes having layers of lithium ion active material ionically attached to their surface" would be expected in the prior art because the structure and composition of the prior art is the same as claimed. *Id.* at 8.

Appellants raise two arguments: (1) Li fails to teach a composition having lithium ions and therefore cannot describe a lithium ion active material ionically attached to the surface of the carbon nanotubes (Appeal Br. 9–11) and (2) Li fails to suggest "discrete, non-agglomerated, and

[6] We observe that the Examiner states that Niu "teaches disassembled (disentangled) discrete carbon nanotubes," but we do not understand the Examiner to rely upon this particular finding in the rejection of claims 1–4, 6–7, and 10–21. *See* Final Act. 6.

exfoliated" carbon nanotubes (*Id.* at 12). Because we agree with Appellants' second argument, we do not reach the first argument.

Appellants contend that Li does not teach "discrete, non-agglomerated, and exfoliated carbon nanotubes" and explain that the SEM images relied upon by the Examiner do not show individual dispersed tubes in Li. Appeal Br. 12. Appellants further assert that the Examiner's interpretation of "discrete, non-agglomerated, and exfoliated carbon nanotubes" based on the SEM image is broad enough to include "agglomerated, entangled, non-individualized nanotubes," and is therefore, unreasonable. *Id.* at 13. Appellants further disagree with the Examiner's position (Final Act. 6), that "because [the nanotubes] are dispersed in the composite cathode slurry mixture" they are "discrete, non-agglomerated, and exfoliated carbon nanotubes," as being conclusory. Reply Br. 6.

The preponderance of the evidence supports Appellants' position. As Appellants explain (Reply Br. 5), Li's SEM images support their position that the Li reference fails to teach "discrete, non-agglomerated, and exfoliated carbon nanotubes" because "one cannot even ascertain two ends of even a single nanotube due to the agglomeration and entanglement of the nanotubes." *Id.* Further, Li describes Figure 2 as showing "a piece of MWCNTs connected to $LiFePO_4$ particles in series and *countless MWCNTs interlaced all particles together* to form a *three-dimensional network* of wiring," and therefore suggests that the carbon nanotubes are bundled or agglomerated. Li 664 (emphasis added). The Examiner's bare statement that "Li 2006 further teaches discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface (MWCNTs with surfaces, see figure 2, which are considered discrete and exfoliated as instantly claimed because

they are dispersed in the composite cathode slurry mixture)," without more, fails address Li's express teaching that suggests bundling or agglomeration of carbon nanotubes. Final Act. 6 (emphasis in original); *see also* Ans. 5 (same). Therefore, on this record, we do not sustain the Examiner's rejection.

CONCLUSION

Appellants identified a reversible error in the Examiner's rejection of claims 1–4 and 10–21 under 35 U.S.C. § 103(a) as unpatentable over Li in view of Niu.

Appellants identified a reversible error in the Examiner's rejection of claims 6 and 7 under 35 U.S.C. § 103(a) as unpatentable over Li in view of Niu and in further view of Zhamu.

DECISION

For the above reasons, the Examiner's rejection of claims 1–4, 6–7, and 10–21 is reversed.

REVERSED

In all communications relating to this appeal, please identify the appeal by its number.

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Comments/Special Requests:
The client, Stephen P. Krupp for MRD, wishes to attend the hearing via telephone @ 573-317-4336.

Gregory L. Porter	40131
Typed or Printed Name of Attorney/Agent/Appellant	Registration No.
/Gregory L. Porter/	2018-04-17
Signature of Attorney/Agent/Appellant	Date

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Electronic Acknowledgement Receipt	
EFS ID:	32398720
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	20-APR-2018
Filing Date:	21-JUN-2012
Time Stamp:	14:14:16
Application Type:	Utility under 35 USC 111(a)

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Confirmation of Hearing by Appellant	HrgConfirmation.pdf	29225 bdb2aa0690f7ee7fdf8d4a6f4c4fc3d998ea8542	no	1
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 03/30/2018

ANDREWS KURTH KENYON LLP
600 Travis Street
Suite 4200
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EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
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HOUSTON, TX 77002

Appeal No:	2017-008,091
Appellant:	Clive P. Bosnyak, et al.
Application No:	13/529,797
Hearing Room:	E
Hearing Docket:	A
Hearing Date:	Thursday, June 14, 2018
Hearing Time:	09:00 AM
Location:	**USPTO** **Hearing Room 155** **207 South Houston Street** **Dallas, Texas 75242**

NOTICE OF HEARING - DALLAS, TEXAS
RESPONSE REQUIRED WITHIN 21 DAYS

Your attention is directed to 37 CFR § 41.47. The above identified appeal will be heard by the Patent Trial and Appeal Board on the date indicated. Hearings will commence at the time set, and as soon as the argument in one appeal is concluded, the succeeding appeal will be taken up. **The time allowed for argument is 20 minutes** unless additional time is requested and approved before the argument commences. **If the application involved in this appeal has been published, the hearing will be open to the public.**

CONFIRMATION OF ATTENDANCE OR WAIVER OF THE HEARING IS REQUIRED WITHIN **21 DAYS** OF THE MAILING DATE OF THIS NOTICE. Failure to respond may subject Appellant(s) to waiver of the oral hearing. If Appellant is no longer interested in having an oral hearing, Appellant must still file a waiver of oral hearing with the Board. This allows the panel to promptly act on the appeal without waiting for the oral hearing date.

Confirmation or waiver of the hearing should be indicated by completing the form below and returning it to the Board. This form may be filed with the Board by any one of the following three alternative methods:

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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130577 7590 05/16/2017
ANDREWS KURTH KENYON LLP
600 Travis Street
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Houston, TX 77002

EXAMINER
STUCKEY, PHILIP A

ART UNIT	PAPER NUMBER
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Appeal No: 2017-008091
Application: 13/529,797
Appellant: Clive P. Bosnyak et al.

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By order of the Patent Trial and Appeal Board.

EMS

DOCKET NO. 223156 (MRE008NP)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Clive P. Bosnyak

SERIAL NO.: 13/529,797

ART UNIT: 1723

EXAMINER: Phillip A. Stuckey

CONFIRMATION NO.: 1004

FILING DATE: June 21, 2012

FOR: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

REPLY BRIEF TO MARCH 10, 2017 EXAMINER ANSWER

COMMISSIONER FOR PATENTS
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SIR:

Responsive to the March 10, 2017 Examiner Answer, entry of the following timely filed Appeal Brief is respectfully requested. Any fee required for appeal forwarding, the request for oral argument, the notice of appeal, extension of time, entry of this paper or the appeal brief, or to avoid abandonment of this application, may be charged to Deposit Account No. 50-0897 referencing attorney docket no. 223156 (MRE008NP). USPTO officials are invited to call the undersigned attorney Gregory L. Porter at 713-220-4621, if a telephone call could help resolve any item.

Reply Arguments begin on page 2.

HOU:3786035.1

REPLY BRIEF TO MARCH 10, 2017 EXAMINER'S ANSWER

The Examiner's Answer states the Applicant and declarant have not considered the Li reference "as a whole" when concluding there can be no ionic attachment between the nanotube surface and active material in the cathode. Perhaps it is not entirely clear where in the course of administrative advocacy mere hyperbole, exaggeration, and exuberance become flat out falsehoods. However, suffice it to say that in this instance, the statement about Applicant not considering the reference "as a whole" earns multiple Pinocchio's.

Dr. Finlayson's declaration detailed precisely why there could be no ions formed in making the cathode and therefore no ionic attachment occurring in the one and only Li paragraph cited in the Office Action. Dr. Finlayson then expressly stated, "Based on this description **and the other teachings of Li** an ordinarily skilled person in the art would understand that Li's MWCNTs do not have any form of lithium ion active material (or anything else) ionically attached to their surface." (Finlayson Decl., para. 4, emphasis added). Thus, the reference "as a whole" was considered in the unrebutted evidence of record.

Basic patent law requires that "when an examiner relies on a scientific theory, **evidentiary support for the existence and meaning of that theory must be provided**." (MPEP 2144.02) "Rejections on obviousness **cannot be sustained with mere conclusory statements**; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); see also *KSR*, 550 U.S. at 418 (quoting Federal Circuit statement with approval). Moreover, as MPEP 2144 states:

> If applicant adequately traverses the examiner's assertion of official notice, the examiner must provide documentary evidence in the next Office action if the rejection is to be maintained. See 37 CFR 1.104(c)(2). See also Zurko, 258 F.3d at 1386, 59 USPQ2d at 1697 ("[T]he Board [or examiner] must point to some

> concrete evidence in the record in support of these findings" to satisfy the substantial evidence test). If the examiner is relying on personal knowledge to support the finding of what is known in the art, the examiner must provide an affidavit or declaration setting forth specific factual statements and explanation to support the finding. See 37 CFR 1.104(d)(2).

The Examiner's unsupported speculation (to the extent it can even be comprehended) cannot be enough to sustain any of these rejections. As explained in detail below, there is simply no evidentiary or explanatory support in the record (or anywhere else for that matter) to support the Examiner's misinterpretation that the Li reference can somehow have "carbon nanotubes [that] have crystals or layers of lithium ion active material **ionically attached** to their surface" as required by each independent claim.

I. The Li Reference Expressly DOES NOT and CANNOT Have "Carbon Nanotubes [that] have Crystals or Layers of Lithium Ion Active Material Ionically Attached to their Surface" as Required by the Claims

Each independent claim expressly requires "carbon nanotubes [that] have crystals or layers of lithium ion active material **ionically attached** to their surface." The Examiner's Answer now admits at page 4 what the Examiner had not admitted previously. That is, Dr. Finalayson is entirely correct that "ions will not form in in the NMP solvent employed in the Li 2008 prior art." (See, Examiner Answer p.4 stating, "This point has not been argued by the office."). Accordingly, there is now no dispute that:

1) ***$LiFePO_4$ does not dissolve in Li's NMP solvent***;

2) ***$LiFePO_4$ cannot form ions when mixed with the nanotubes***; and

3) therefore, ***$LiFePO_4$ cannot form ionic attachments of lithium ion active material to nanotubes when making the cathode of the Li reference.***

Despite the recent new admission the Examiner's Answer still somehow concludes on page 6 that: "it is expected that the prior art teaches" that "carbon nanotubes have crystals or

layers of lithium ion active material ionically attached to their surface." It is unclear what the basis for this "expectation" could be since the Examiner Answer does not explain what temperature, pressure, solvent, and/or other reaction conditions could cause this conjectural ionic bonding between $LiFePO_4$ and nanotube surfaces to occur in the Li reference.

In contrast, the instant specification describes that one way to form the ionic attachments to the surface of the nanotubes is to employ oxidized carbon nanotubes with solutions that do form ions. (See, e.g., Example 2 of instant specification). When conducted in this manner as claimed (as opposed to mixing without forming ions like Li) an 18.6X improvement is seen in resistance. (See Table 1 of instant specification).

II. The Examiner Answer's Explanation (or Lack Thereof) Pertaining to the Li Reference Further Confirms that the Rejections Are Improper

Instead of addressing the declaration and peer-reviewed evidence Applicant provided or providing counter evidence or some explanation of how the claimed ionic bonding occurs, Examiner's Answer simply refers to the "steps that expose the multiwalled carbon nanotubes / LiPO4 to electrolyte $LiPF_6$ in the ethyl methyl carbon dimethyl carbonate" and then blames Applicant for not addressing those steps through "arguments or declaration."

How can Applicant address a reference to a step when there is no explanation or rationale provided as to how the given step could somehow lead to the claimed "carbon nanotubes [that] have crystals or layers of lithium ion active material **ionically attached** to their surface"? The fact that a step may cause "cathodic reduction" or "charge transfer of ionic species" in a battery does not remotely suggest to a skilled artisan that bonding is occurring much more bonding that would lead to the the precisely claimed "carbon nanotubes [that] have crystals or layers of lithium ion active material **ionically attached** to their surface." All batteries (with or without nanotubes and with or without lithium ion active material) may have cathodic reduction.

However, not all batteries have the claimed "carbon nanotubes [that] have crystals or layers of lithium ion active material **ionically attached** to their surface." This is shown in Applicant's own examples wherein Comparative Example 1 and inventive Example 2 both have carbon nanotubes and $LiFePO_4$. However, Comparative Example 1 does not have the claimed ionic attachment while inventive Example 2 does have it. The battery with the claimed ionic attachment has an 18.6X improvement in performance over the one like the Li reference that does not.

> On this point another Pinocchio appears in the Examiner's Answer on page 5:
>
> The applicant's arguments presented in the Appeal Brief are prima faice (sic) flawed. Point 3 on page 11 states that [in regard to Li] "$LiFePO_4$ cannot form ionic attachments of lithium ion active material." Pending claim 3 positively claims that the lithium metal salt is $LiFePO_4$. Based on claim analysis alone, one would reasonably expect that $LiFePO_4$ can form ionic attachments of lithium ion active material.

As described above with respect to Comparative Example 1 and inventive Example 2 just because a battery has both nanotubes and $LiFePO_4$ does not mean that it has the claimed "carbon nanotubes [that] have crystals or layers of lithium ion active material **ionically attached** to their surface." It is the Examiner's logic that is *prima facie* flawed. The rejection regarding Li should be overturned since the suggested combination cannot and does not teach each element of independent Claims 1, 10, 11, and 12.

III. Li Does not Teach or Suggest Discrete, Non-Agglomerated, and Exfoliated Carbon Nanotubes as Required by the Claims

The Li reference does not teach or suggest the claimed "discrete, non-agglomerated, and exfoliated carbon nanotubes" which is confirmed by Li's own SEM images below. In fact, one cannot even ascertain two ends of even a single nanotube due to the agglomeration and entanglement of the nanotubes.

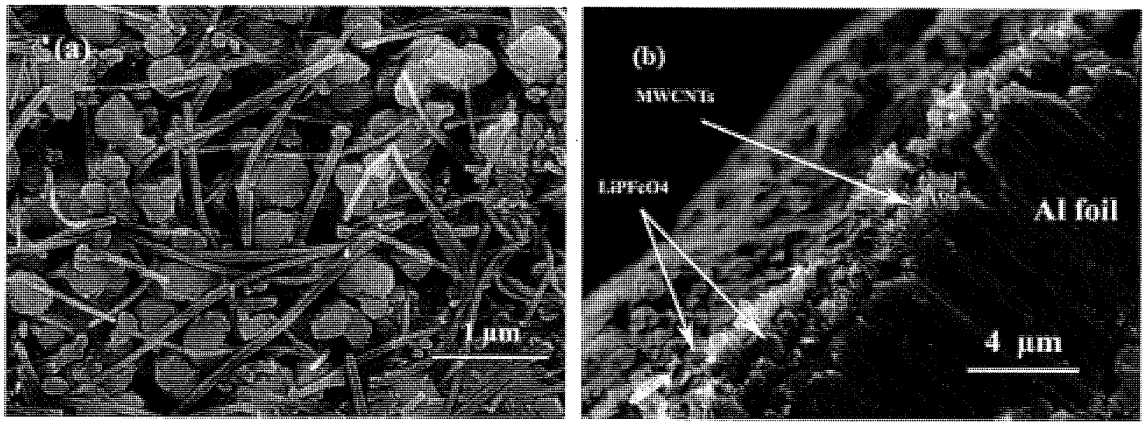


Figure 2 of Li showing non-discrete, agglomerated carbon nanotubes

The sole explanation provided for the Office Action's conclusory BRI assertion is that the nanotubes of Li "are considered discrete and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture." (Office Action page 6). The relevant portion of Li states:

"The cathode slurry was prepared by mixing LiFePO4, polyvinylidone difluoride (PVDF) and acetylene black or MWCNTs in the weight ratio of 90:5:5 in N-methyl-2-pyrrolidone (NMP) solvent." (Li, page 664).

There is no scientific evidence or explanation provided in the Office Action as to how mere "mixing" of LiFePO4, polyvinylidone difluoride (PVDF) and MWCNTs would somehow change the agglomerated nanotubes to "discrete, non-agglomerated, and exfoliated" as is required by the claims. In sum, an ordinarily skilled artisan, upon seeing Li, Figure 2, would immediately understand that the nanotubes of Li are not "discrete, non-agglomerated, and exfoliated" as is required by the claims.

IV. Conclusion

The Examiner has failed to meet the Appellant's clear challenge in the opening brief to provide "some articulated reasoning with some rational underpinning to support the legal

conclusion of obviousness." *In re Kahn*, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). All rejections should be withdrawn and the claims allowed.

Respectfully submitted,

/Gregory L. Porter/
Registration No. 40,131

May 10, 2017

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PTO/AIA/32 (03-13)
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REQUEST FOR ORAL HEARING BEFORE THE PATENT TRIAL AND APPEAL BOARD	Docket Number (Optional) MRE008NP/223156

I hereby certify that this correspondence is being facsimile transmitted to the USPTO, EFS-Web transmitted to the USPTO, or deposited with the United States Postal Service with sufficient postage in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on _____. Signature _____ Typed or printed name _____	In re Application of Clive P. Bosnyak	
	Application Number 13/529,797	Filed 2012-06-21
	For Lithium Ion Batteries Using Discrete Carbon Nanotubes...	
	Art Unit 1723	Examiner Phillip A. Stuckey

Applicant hereby **requests an oral hearing** before the Patent Trial and Appeal Board in the appeal of the above-identified application.

The fee for this Request for Oral Hearing is (37 CFR 41.20(b)(3)) $ 1,300.00

☑ Applicant asserts small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by 50%, and the resulting fee is: $ 650.00

☐ Applicant certifies micro entity status. See 37 CFR 1.29. Therefore, the fee shown above is reduced by 75%, and the resulting fee is: $ _____
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 50-0897.

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For extensions of time in reexamination proceedings, see 37 CFR 1.550.

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☐ applicant ☑ attorney or agent of record Registration number 40131 ☐ attorney or agent acting under 37 CFR 1.34 Registration number _____

Signature /Gregory L. Porter/

Typed or printed name Gregory L. Porter

Telephone Number 713.220.4621

Date May 9, 2017

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☑ * Total of 1 forms are submitted.

This collection of information is required by 37 CFR 41.20(b)(3). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	13529797
Filing Date:	21-Jun-2012
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Filer:	Gregory L. Porter/Jeanne Dunn
Attorney Docket Number:	DENA-0008 (223156)

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
REQUEST FOR ORAL HEARING	2403	1	650	650
APPEAL FORWARDING FEE	2413	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1650**

Electronic Acknowledgement Receipt	
EFS ID:	29161099
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	09-MAY-2017
Filing Date:	21-JUN-2012
Time Stamp:	16:36:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1650
RAM confirmation Number	051017INTEFSW00003896500897
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Reply Brief Filed	ReplyBrief.pdf	119604 1f9cfda7b8078c253e963fad476f442634ecebe6	no	7
Warnings:					
Information:					
2	Request for Oral Hearing	RequestOralHearing.pdf	239485 b3e281e16440e66a66c39f5100f28e89e86a0dbb	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32364 93d9dfb8a8a3562ae2f6331d2c09974bc5610685	no	2
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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
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Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	13/529,797	BOSNYAK ET AL.	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 3/10/17	**This patent is subject to a Terminal Disclaimer**	

Approved/Disapproved by:
Felicia D. Roberts 8,968,924

U.S. Patent and Trademark Office

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 03/10/2017

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EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
03/10/2017	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Application Number: 13/529,797
Filing Date: June 21, 2012
Appellant(s): BOSNYAK ET AL.

Gregory L. Porter
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 01/24/2017.

(1) Grounds of Rejection to be reviewed on Appeal

Every ground of rejection set forth in the Office action dated 08/19/2016 from which the appeal is taken is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

The following ground(s) of rejection are applicable to the appealed claims as recited in the final rejection:

Claim 1 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 8,968,924.

*Note, the applicant has indicted on page 4 of the Appeal Brief that a terminal disclaimer has been file for US Patents 8,808,909 and 8,968,924; however, *only one terminal disclaimer appears on the record* for US Patent 8,808,909, and therefore, the **provisional rejection over US Patent 8,968,924 remains herein**.

*Note, the applicant has indicted on page 4 of the Appeal Brief that Claims 1-4 and 10-21 are rejected "… in further view of Zhamu '337". This statement is an inaccurate reflection of the record as the rejection of claims 1-4 and 10-21 do not rely upon Zhamu '337; the grounds of prior art rejection are noted in the final rejection and as follows:

Claims 1-4 and 10-21 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Li et al., *A novel network composite cathode of LiFePO4/multiwalled*

carbon nanotubes with high rate capability for lithium ion batteries, Electrochemistry Communications, Volume 9, Issue 4, April 2007, Pages 663-666, herein referred to as "Li 2006" in view of Niu et al., US 7,070,753 B2, herein referred to as Niu '753.

Claims 6 and 7 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Li 2006 in view of Niu '753 and in further view of Zhamu et al., US 2010/0176337 A1, herein referred to as Zhamu '337.

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner:

The nonstatutory double patenting rejection over US 8,808,909 is withdrawn due to the filing of the corresponding terminal disclaimer on 01/24/2017.

The terminal disclaimer filed on 01/24/2017 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent 8,808,909 has been reviewed and is accepted. The terminal disclaimer has been recorded.

(2) Response to Argument

The applicant through recent prosecution has argued (as noted on page 8 1st line of the appeal brief) that "to 'ionically attach' requires ions". As discussed in the prosecution history, numerous interviews, and as discussed herein, The Office disagrees with the arguments.

The primary prior art reference, Li 2008, is directed toward a lithium ion battery with multiwalled carbon nanotubes and $LiFePO_4$ as a cathode material; this point alone goes directly against the applicant's argument that the "Li reference does not have lithium ions" per page 8 of the appeal brief.

Furthermore, as noted in the prosecution history, the declarations are defective in response to Argument A on page 8 of the Appeal Brief. Toward point 1 of Argument A directed toward the 05/18/2016 Declaration of Finlayson, Finlayson indicated that ions will not form in the NMP solvent employed in the Li 2008 prior art. This point has not been argued by the office, but rather that the Li 2008 reference has not been considered as a whole in the declaration or arguments, and that other process and manufacturing steps of producing the lithium ion battery of the Li 2008 prior art would expectantly result in the claimed "ionically attached structure". For example, the applicant has not addressed through arguments or the declaration, the steps that expose the multiwalled carbon nanotubes / $LiFePO_4$ to electrolyte: $LiPF_6$, in the ethyl methyl carbon / dimethyl carbonate; **it is well known that an electrolyte in a lithium ion battery, as used by Li 2008, is intended to conduct ions (emphasis added).** Furthermore, the Li 2009 charges and discharges the resulting cathode contains multiwalled carbon nanotubes / $LiFePO_4$ causing cathodic reduction (see page 665 of Li 2008), which *involves charge transfer of* ***ionic species***. This point directly aligns with Dr. Finlayson's axiom that" "[a]n ordinarily skilled artisan understands that for ionic attachment to occur there necessarily needs to be ions present". The applicant has not considered the prior art as a whole.

Toward point 2 of Argument A directed toward Li not teaching discrete, non-agglomerated, and exfoliated carbon nanotubes; this argument is not persuasive. The micrograph of Li 2008 reproduced in the Appeal Brief and reproduced below clearly teaches the discrete, non-agglomerated, and exfoliated carbon nanotubes and certainly teaches the claimed limitations when one gives a broadest reasonable interpretation to discrete, non-agglomerated, and exfoliated carbon nanotubes as shown below.

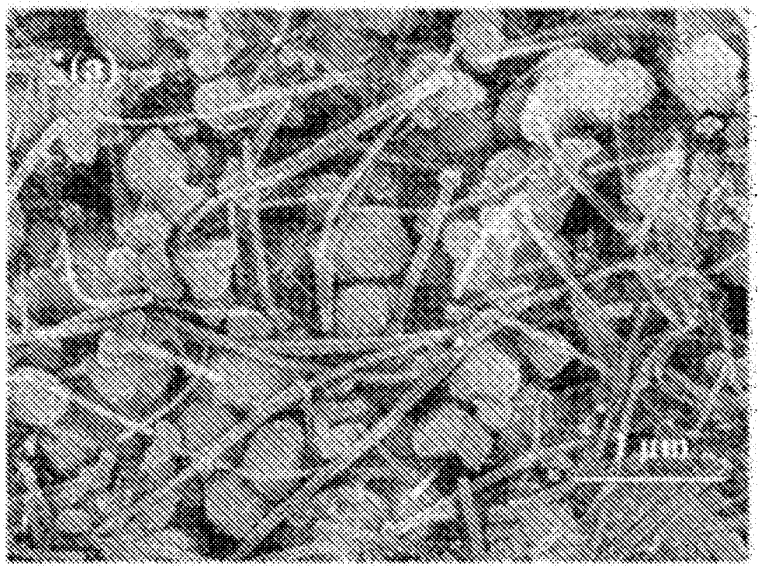


Fig. 2. SEM images of $LiFePO_4$/MWCNTs comp

Furthermore, the applicant's arguments presented in the Appeal Brief are prima faice flawed. Point 3 on page 11 states that "$LiFePO_4$" cannot form ionic attachments of lithium ion active material". Pending claim 3 positively claims that the lithium metal salt is $LiFePO_4$. Based on claim analysis alone, one would reasonably expect that $LiFePO_4$ can form ionic attachments of lithium ion active material. This argument is therefore moot.

For these reasons, it is expected that the prior art teaches the instantly claimed composition useful for lithium ion batteries claiming among other aspects discrete, non-agglomerated, and exfoliated carbon nanotubes and the discrete carbon nanotubes have crystals or layers of lithium ion active material ionically attached to their surface as discussed above and as discussed throughout the prosecution history.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Philip A. Stuckey/
Examiner, Art Unit 1723

/MILTON I CANO/
Supervisory Patent Examiner, Art Unit 1723

Conferees:

/RICHARD CRISPINO/
Supervisory Patent Examiner, Art Unit 1700

/MILTON I CANO/
Supervisory Patent Examiner, Art Unit 1723

Requirement to pay appeal forwarding fee. In order to avoid dismissal of the instant appeal in any application or ex parte reexamination proceeding, 37 CFR 41.45 requires payment of an appeal forwarding fee within the time permitted by 37 CFR 41.45(a), unless appellant had timely paid the fee for filing a brief required by 37 CFR 41.20(b) in effect on March 18, 2013.

PTO/AIA/26 (04-14)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) DENA-0008 (223156)

In re Application of: Clive P. Bosnyak

Application No.: 13/529,797

Filed: 2012-06-21

For: Lithium Ion Batteries Using Discrete Carbon Nanotubes, Methods for Production Thereof and Products Obtained Therefrom

The applicant, Molecular Rebar Design, LLC, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 8,968,924 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

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is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

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I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 40131

/Gregory L. Porter/ — Signature
2017-03-10 — Date

Gregory L. Porter — Typed or printed name

Title
713.220.4614 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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Filing Date:	21-Jun-2012				
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM				
First Named Inventor/Applicant Name:	Clive P. Bosnyak				
Filer:	Gregory L. Porter				
Attorney Docket Number:	DENA-0008 (223156)				
Filed as Large Entity					
Filing Fees for Utility under 35 USC 111(a)					
Description		**Fee Code**	**Quantity**	**Amount**	**Sub-Total in USD($)**
Basic Filing:					
Pages:					
Claims:					
Miscellaneous-Filing:					
Petition:					
Patent-Appeals-and-Interference:					
Post-Allowance-and-Post-Issuance:					
Extension-of-Time:					

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	160	160
		Total in USD ($)		**160**

Electronic Acknowledgement Receipt	
EFS ID:	28600748
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter
Filer Authorized By:	
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	10-MAR-2017
Filing Date:	21-JUN-2012
Time Stamp:	17:40:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$160
RAM confirmation Number	031317INTEFSW00004395500897
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer Filed	TD_US8968924.pdf	141448 139c3c6a2985bc68a3d4fa83958df049f0e22d8d	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30593 912579f800707d721d812832a4d1254a16bbe387	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	172041		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
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National Stage of an International Application under 35 U.S.C. 371
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 01/27/2017

ANDREWS KURTH KENYON LLP
600 Travis Street
Suite 4200
Houston, TX 77002

EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
01/27/2017	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patenttrademarks@andrewskurth.com

Applicant-Initiated Interview Summary	Application No.	Applicant(s)	
	13/529,797	BOSNYAK ET AL.	
	Examiner	Art Unit	
	Philip A. Stuckey, PhD	1723	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Philip A. Stuckey*.

(2) *Milton Cano*.

(3) *Greg Porter/ Steve Krupp*.

(4) *Malcolm Finlayson*.

Date of Interview: *12 January 2017*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1 and 3*.

Identification of prior art discussed: *of record*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

See Continuation Sheet.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/Philip A. Stuckey/ Examiner, Art Unit 1723	/MILTON I CANO/ Supervisory Patent Examiner, Art Unit 1723

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

———

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments:

In addition to Mr. Gregory Porter and Mr. Steve Krupp, Dr. Malcolm Finlayson whom authored one of the 05/18/2016 declarations, joined the conversation. Dr. Finlayson extensively described the declaration with reference to Table 8 and the NMP solubility in water; Dr. Finlayson referred to the Li 2006 mixture as an ad mixture and coined as such since there was no bonding in the mixture; Finlayson further reiterating that the LiFePO4 does not dissolve in NMP as discussed in the declaration and as linked to the Li '2006 reference of record and indicated that there was a stark difference shown. Examiner Stuckey clearly indicated that this aspect has been considered; as noted in the Final Rejection, the declaration did not address all aspects of the Li '2006 reference with sufficient evidence to overcome the rejection; there are other method steps that do involve ionic species; those steps have not been addressed. After some discussion, the questions that where then asked by the examiners from the previous conversation and had not been answered: How do the ionic bonds in the instant disclosure form? And would other steps of Li '2006 (that were not addressed in the Declaration) form any type of ionic bonding?

It was again noted by the examiners that at this point that there is no submitted evidence that addresses all steps of the Li reference and that the process of the preparation of the carbon nanotubes with the composition appears to be critical; the examiners explained that the scope of the claim requires the following elements in the composition: the discrete carbon nanotubes having crystals or layers ionically attached to their surface and that based on the scope of the claims, the ion active materials and the exfoliated carbon nanotubes mixed together would meet the scope of the claim as there is lacking a clear claim element to distinguish how the ionic bonding would occur or how it would not occur in the prior art. Dr. Finlayson and the applicant's representative again asserted that the NMP cannot make the ionically attached aspect; Dr. Finlayson indicated that there needs to be an ionic aspect present, i.e. aqueous solution, for ionic bonding to occur. It was again indicated by the examiners that the scope of the claim does not recite such elements, i.e. aqueous dispersion, and that one of ordinary skill would expect the composition to be taught by the references of record.

Examiner Stuckey noted that at this point in prosecution, this discussion was the first instance that the applicant had explained the process of ionic bonding and further indicated that there was no written disclosure of those steps critical to form an ionic bond. Dr. Finlayson's comments were that the aqueous dispersion was needed, the applicant's representative indicated that the process was not critical. Finlayson indicated that LiFePO4 is made in an aqueous process in the instant disclosure. Examiner Stuckey indicated that the prior art search was not conducted in such a fashion that limited mixtures of ion active materials (LiFePO4) in aqueous solution with carbon nanotubes. The applicant's representative could not understand how that strategy would not be considered in a search; it was clearly explained that the claims (and even the specification) did not warrant that search strategy.

No agreements were reached and it is expected that the applicant will file an appeal brief.

Doc Code: DIST.E.FILE **Document Description: Electronic Terminal Disclaimer - Filed**	PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT**
Application Number	13529797
Filing Date	21-Jun-2012
First Named Inventor	Clive Bosnyak
Attorney Docket Number	DENA-0008 (223156)
Title of Invention	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
MOLECULAR REBAR DESIGN, LLC	100%

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

8808909

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:
- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

○ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.	
Applicant claims the following fee status: ◉ Small Entity ○ Micro Entity ○ Regular Undiscounted I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.	
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES I certify, in accordance with 37 CFR 1.4(d)(4) that I am: ◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application Registration Number 40131 ○ A sole inventor ○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application ○ A joint inventor; all of whom are signing this request	
Signature	/Gregory L. Porter/
Name	Gregory L. Porter

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	13529797
Filing Date:	21-Jun-2012
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Filer:	Gregory L. Porter/Jeanne Dunn
Attorney Docket Number:	DENA-0008 (223156)

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	2814	1	160	160
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**160**

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 13529797

Filing Date: 21-Jun-2012

Applicant/Patent under Reexamination: Bosnyak

Electronic Terminal Disclaimer filed on January 24, 2017

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt	
EFS ID:	28149843
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	24-JAN-2017
Filing Date:	21-JUN-2012
Time Stamp:	14:12:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$160
RAM confirmation Number	012517INTEFSW00000441500897
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Electronic Terminal Disclaimer-Filed	eTerminal-Disclaimer.pdf	33423 0562e8c3dcb9b3dde1f511d434f2f7862f2f2a3c	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30741 595c087a3881429074edd637910075747 6dd705e	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	64164		

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	2814	1	160	160
		Total in USD ($)		**160**

Electronic Acknowledgement Receipt	
EFS ID:	28150518
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	24-JAN-2017
Filing Date:	21-JUN-2012
Time Stamp:	14:32:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Fee Worksheet (SB06)	fee-info.pdf	30733 b9183edebd456b9616bbb3e39c0036a2f3625ce4	no	2
Warnings:					

Information:	
Total Files Size (in bytes):	30733

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STATUTORY OR TERMINAL DISCLAIMER	2814	1	160	160
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Electronic Acknowledgement Receipt	
EFS ID:	28152988
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
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First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	24-JAN-2017
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Time Stamp:	15:59:44
Application Type:	Utility under 35 USC 111(a)

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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

DOCKET NO. 223156 (MRE008NP)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Clive P. Bosnyak

SERIAL NO.: 13/529,797

ART UNIT: 1723

EXAMINER: Phillip A. Stuckey

CONFIRMATION NO.: 1004

FILING DATE: June 21, 2012

FOR: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

APPEAL BRIEF

COMMISSIONER FOR PATENTS
PO BOX 1450
ALEXANDRIA, VA 22313-1450

SIR:

Responsive to the outstanding Official Action dated August 19, 2016, entry of the following timely filed Appeal Brief is respectfully requested. Any fee required for the notice of appeal, extension of time, entry of this paper, or to avoid abandonment of this application, may be charged to Deposit Account No. 50-0897 referencing attorney docket no. 223156 (MRE008NP). The Examiner is invited to call the undersigned attorney at 713-220-4621, if a telephone call could help resolve any item.

HOU:3753332.1

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I. Real Party in Interest

The real party in interest is the assignee of record, MOLECULAR REBAR DESIGN, LLC. Another interested party is licensee BLACK DIAMOND STRUCTURES, LLC which is a joint venture between Molecular Rebar Design, LLC and SABIC.

II. Related Appeals and Interferences

There are presently no related appeals, interferences or trials.

III. Status of Claims

Claims 1-4, 6-7, and 10-21 are pending. Claims 1-4 and 10-21 stand rejected under 35 U.S.C. § 103 as obvious over the primary reference of Li 2006, in view of Niu '753, and in further view of Zhamu '337 for reasons set forth on pages 5-18 of the Office Action. Claims 6 and 7 stand rejected under 35 U.S.C. § 103 as obvious over Li 2006, in view of Niu '753, and in further view of Zhamu '337 for reasons set forth on page 18 of the Office Action.

A terminal disclaimer was filed thereby mooting the nonstatutory double patenting rejections over U.S. Patent Nos. 8,808,909 and 8,968,924 described on pages 21-23 of the Office Action.

IV. Status of Amendments

No amendments were filed after the Final Office Action dated August 19, 2016.

V. Summary of Claimed Subject Matter

Independent Claim 1 is directed to a composition useful for lithium ion batteries comprising: discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active material ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube. Paras. [0009]-[0024], [0026], [0040].

Independent Claim 10 is directed to a composition useful for lithium ion batteries, comprising discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials ionically attached to their surface, and wherein the carbon nanotubes are in a weight ratio of carbon nanotubes to lithium salts of 0.1% to 10% and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube. Paras. [0009]-[0024], [0026], [0040].

Independent Claim 11 is directed to a composition useful for lithium ion batteries, comprising oxidized discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials attached to their surface, and wherein the carbon nanotubes are uniformly dispersed without clustering on a dimension scale of less than about 1 micrometer and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and

wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube. Paras. [0009]-[0024], [0026], [0040].

Independent Claim 12 is directed to a composition for lithium ion batteries, comprising uniformly dispersible oxidized , non-agglomerated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube. Paras. [0009]-[0024], [0026], [0040].

VI. Argument

It is both axiomatic and elementary chemistry that to "ionically attach" requires ions. The record evidence is undisputed and unequivocal that the prior art references relied upon by the Examiner do not and cannot have ions present. As such, the rejections are technically and legally flawed and the claims should be allowed.

A. Sworn Declarations and Peer Reviewed Literature Unequivocally Prove that Li Does Not and Cannot Have "Crystals or Layers of Lithium Ion Active Material Ionically Attached" to the Surface of Nanotubes as Required by the Claims

Claims 1-4, 6-7, and 10-21 stand rejected as obvious over the primary reference of Li et al. ('A novel network composite cathode of LiFePO4/multiwalled carbon nanotubes with high rate capability for lithium ion batteries, Electrochemistry Communications, 9:4, April 2007, pp. 663-666, hereinafter referred to as "Li"). For the reasons discussed below, these rejections are technically and legally flawed.

Independent Claims 1, 10, 11 and 12 all recite "discrete carbon nanotubes [that] have crystals or layers of **lithium ion active** material **ionically attached** to their surface." This limitation is also incorporated into Claims 3-4, 6-7 and 13-21, which each depend respectively from one of Claims 1, 10, 11 and 12. The use of Li as a primary reference for these rejections is technically and legally flawed because of the following fact:

The Li reference does not have lithium ions.

As a matter of logic and science, it is simply *not possible* for there to be "ionically attached" lithium ion active material where there are no lithium ions. Therefore, Li *cannot* teach or suggest crystals or layers of ***lithium ion*** active material ***ionically*** attached to the surface of nanotubes as required by the present claims.

As described below, the supporting declarations and their scientific reasoning that evidence this fundamental fact have been improperly ignored in conclusory fashion.

1. The Disclosure of Li Does Not Have Lithium Ions Present, Therefore Li Cannot Teach or Suggest "Ionically Attached" Crystals or Layers of Lithium Ion Active Material as Proven by Unequivocal Record Evidence

The claims require discrete carbon nanotubes that "have crystals or layers of lithium ion active material ionically attached to their surfaces." The May 18, 2016 Declaration of Dr. Finlayson reviewed the teachings of Li and other literature and unequivocally concluded that even **"an ordinarily skilled person in the art would understand that Li's MWCNTs do not have any form of lithium ion active material (or anything else) ionically attached to their surface."** (Finlayson Decl., para. 4). Dr. Finlayson specifically described the scientific basis and provided indisputable peer-reviewed evidence in support of his conclusion that there could not be lithium ions present in Li, and that Li "would not result in carbon nanotubes with "crystals or layers of lithium ion active material ionically attached to their surface" as required by independent Claims 1, 10, 11, and 12." (Finlayson Decl., para. 5).

First, Dr. Finlayson stated the logical and scientific axiom that "[a]n ordinarily skilled artisan understands that for ionic attachment to occur there necessarily needs to be ions present." (Finlayson Decl., para. 5). This statement has not and cannot be disputed by the Examiner.

Second, Dr. Finlayson stated that it "is well-known and described in the literature" that "$LiFePO_4$ does not dissolve in the solvent employed in Li, i.e., N-methyl-2-pyrolidone (NMP). (Finlayson Decl., para. 5). In support of this statement, Dr. Finlayson cited the peer reviewed literature reference of "p. 204 of Nanotechnology for Lithium-Ion Batteries by Abu-Lebdeh et al. stating, 'we can conclude that the $LiFeP0_4$ does not react with this product [NMP].'" (Finlayson Decl., para. 5). Therefore, Dr. Finalyson concluded that the mixing of $LiFePO_4$ and NMP

"certainly would not result in carbon nanotubes with 'crystals or layers of lithium ion active material ionically attached to their surface' as required by independent Claims 1, 10, 11 and 12." (Finlayson Decl., para. 5)

In fact, during the January 10th and January11th, 2017 interviews with the USPTO regarding the present application, neither of the USPTO's representatives disputed Dr. Finlayson's explanation of the science regarding either Li or the instant application. Therefore, it remains undisputed in the record that:

The Li reference does not have lithium ions and cannot be ionically attached.

Instead of addressing the declaration and peer-reviewed evidence provided or providing counter evidence, the Final Office Action simply cites to Li, p. 664 last paragraph and argues without any technical support whatsoever that "$LiFeP0_4$ of Li 2006 does undergo a process in which the lithium ion active material of Li 2006 is exposed to a ionic environment ($LiPF_6$/EMC/DMC electrolyte) when the cathode slurry is applied to the Al foil." However, the Li paragraph cited in the Office Action is the same paragraph that Dr. Finlayson was referring to that uses an N-methyl-2-pyrrolidone (NMP) solvent and therefore adding the solids to the mixture simply *cannot* react with $LiFeP0_4$ to form lithium ions leading to ionic attachments. That is, there is no lithium ion active material as required by the claims and there can be no ionic attachment in Li.

The Final Office Action cites to Li's Figure 2, stating, "Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2." The Final Office Action offers no support or reasoning for this conclusory statement. Figure 2 is simply an SEM image of $LiFeP0_4$/MWCNTs. As a matter of fundamental

scientific principle, ions and electrons are not visible in an SEM image such as Figure 2. Thus, Figure 2 simply does not and cannot teach or suggest ionic attachment of any kind.

Accordingly, the unrebutted evidence proves that:

1) ***$LiFePO_4$ does not dissolve in Li's NMP solvent***;

2) thus, ***$LiFePO_4$ cannot form lithium ions***; and

3) therefore, ***$LiFePO_4$ cannot form ionic attachments of lithium ion active material***.

During the January 11, 2017 interview with the USPTO regarding the present application, the USPTO's representatives alternatively argued that the claims were not commensurate in scope with the arguments, and that the claim language did not adequately distinguish from Li. However, as can be seen by reading the present claims, independent Claims 1, 10, 11 and 12 all recite "discrete carbon nanotubes [that] have crystals or layers of ***lithium ion active*** material ***ionically attached*** to their surface" (bold emphasis added). Therefore, given that the claims explicitly recite "lithium ion active" and "ionically attached" materials, it is clear that Claims 1, 10, 11 and 12 are precisely commensurate in scope with the arguments. Again, as a matter of undisputed fact Claims 1, 10, 11 and 12 are adequately distinguishable from Li because,:

The Li reference does not have lithium ions.

The secondary reference of Niu does not remedy Li's deficiency as it does not even relate to lithium ion active materials.[1] Therefore, the claims cannot be rendered obvious because the suggested combination does not and cannot yield carbon nanotubes with "crystals or layers of

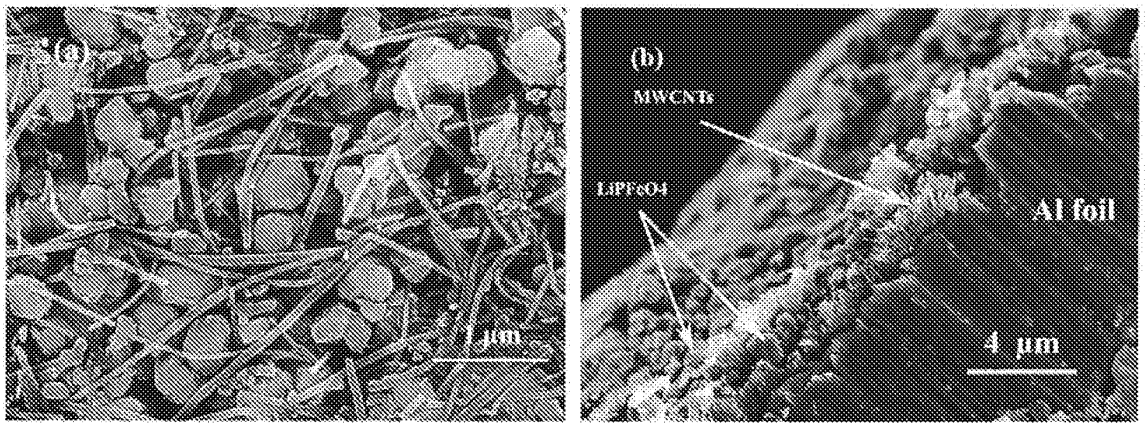
[1] The Office Action refers to MPEP section 2112.01 which relates to when the structure of a reference is substantially identical to that of the claims. However, that MPEP section is inapposite here wherein the claimed structure is substantially different from Li due to the claimed structure having ionic attachment,whereas: ***Li and Niu do not have lithium ions***, so therefore cannot have any ionic attachment of any lithium ion active material.

lithium ion active material ionically attached to their surface" as required by independent Claims 1, 10, 11, and 12.

2. Li Does not Teach or Suggest Discrete, Non-Agglomerated, and Exfoliated Carbon Nanotubes as Required by the Claims

Furthermore, the Final Office Action states that the rejection relies upon the Li reference as teaching nanotubes that are discrete, non-agglomerated, and exfoliated. This rejection is also technically and legally flawed.

In fact, the Li reference does not teach or suggest the claimed "discrete, non-agglomerated, and exfoliated carbon nanotubes" in any way. This is confirmed, as shown below, by Li's own SEM images, wherein one cannot ascertain two ends of even a single nanotube due to the agglomeration and entanglement of the nanotubes.



Because the Li SEM images show agglomerated, entangled nanotubes the Final Office Action resorts to asserting that somehow the Broadest Reasonable Interpretation (BRI) standard means that Li teaches discrete, non-agglomerated, and exfoliated nanotubes. (Office Action, page 3). However, "[e]ven under the broadest reasonable interpretation, [a] construction cannot be divorced from the specification and the record evidence, and must be consistent with the one

that those skilled in the art would reach." *Microsoft Corp. v. Proxycomn*, 789 F.3d 1292, 1297 (Fed. Cir. 2015).

The Examiner's construction that the claimed "discrete, non-agglomerated, and exfoliated nanotubes" can include agglomerated, entangled, non-individualized nanotubes is simply not reasonable. These are mutually exclusionary terms that cannot be considered equivalent in any manner.

The sole explanation provided for the Office Action's conclusory BRI assertion is that the nanotubes of Li "are considered discrete and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture." (Office Action page 6). The relevant portion of Li states:

"The cathode slurry was prepared by mixing LiFePO4, polyvinylidone difluoride (PVDF) and acetylene black or MWCNTs in the weight ratio of 90:5:5 in N-methyl-2-pyrrolidone (NMP) solvent." (Li, page 664).

There is no scientific evidence or explanation provided in the Office Action as to how mere "mixing" of LiFePO4, polyvinylidone difluoride (PVDF) and MWCNTs would somehow lead to the nanotubes being "discrete, non-agglomerated, and exfoliated" as is required by the claims. The instant specification clearly describes "discrete" nanotubes in paragraph [004] as being "individual uniformly dispersed tubes." Even under the BRI standard, a construction that "discrete, non-agglomerated, and exfoliated nanotubes" can include agglomerated, entangled, non-individualized nanotubes is simply not reasonable.

In sum, an ordinarily skilled artisan, upon seeing Li, Figure 2, would immediately understand that the nanotubes of Li are not "discrete, non-agglomerated, and exfoliated" as is required by the claims.

B. The Rejections Lack Logic, Sound Scientific Principle, and Evidentiary (Or Any Other) Support

Applicant is unaware of any authority that allows the USPTO to rely on unsupported conclusory statements as grounds for a rejection when the conclusory statements are directly contradicted by record evidence of sworn declarations and peer-reviewed literature. As detailed above, the rejections are not based on logic or sound scientific principle, which is contrary to the guidance provided in the MPEP (*see* MPEP 2144.02). The rationale to support a rejection under 35 U.S.C. 103 may rely on logic and sound scientific principle. *In re Soli*, 317 F.2d 941, 137 USPQ 797 (CCPA 1963). However, the USPTO "may not, without some basis in logic or scientific principle, merely allege that such differences are either obvious or of no patentable significance and thereby force an appellant to prove conclusively that it is wrong." *Id.* Accordingly, when an examiner relies on a scientific theory, evidentiary support for the existence and meaning of that theory must be provided. *In re Grose*, 592 F.2d 1161, 201 USPQ 57 (CCPA 1979) (Court held that different crystal forms of zeolites would not have been structurally obvious one from the other because there was no chemical theory supporting such a conclusion. The known chemical relationship between structurally similar compounds (homologs, analogs, isomers) did not support a finding of prima facie obviousness of claimed zeolite over the prior art because a zeolite is not a compound but a mixture of compounds related to each other by a particular crystal structure.).

The conclusory final rejections without evidentiary support violate the above-described basic tenets of examination procedure and should be withdrawn. Moreover, the evidentiary support provided by Applicant has, in fact, proven conclusively that the USPTO is wrong. Accordingly, the claims should be deemed patentable.

C. The USPTO Has Improperly Maintained The Rejections Despite The Undisputed Scientific Evidence Rebutting the USPTO's Position

MPEP 706.07 states that "examiners should not make hasty and ill-conceived final rejections. The applicant who is seeking to define his or her invention in claims that will give him or her the patent protection to which he or she is justly entitled should receive the cooperation of the examiner to that end, and not be prematurely cut off in the prosecution of his or her application." The instant rejections are hasty and ill-conceived in that they ignore definitive scientific evidence that Li cannot have ionically attached lithium ion active material. In addition, the rejections speculate that under BRI Li somehow teaches discrete, non-agglomerated, and exfoliated carbon nanotubes. In doing so the Office Action ignores the clear disclosure of Li, Figure 2, and the language of the instant specification.

By simultaneously accepting the unrebutted scientific evidence put forward by Applicant, and yet maintaining the rejections nonetheless, the USPTO has denied Applicant the cooperation that Applicant is entitled to expect from the USPTO. Unfortunately, Applicant has been forced to file the present appeal despite having already provided unrebutted expert testimony and accompanying scientific evidence in support of the patentability of the claims. This is improper and a waste of resources of both the Applicant and the Board. Accordingly, in addition to withdrawal of the improper rejections, Applicant requests the Board institute whatever remedial measures it feels may be appropriate to ensure this does not happen again.

VII. Conclusion -

All rejections should be withdrawn and the claims allowed.

Respectfully submitted,

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January 24, 2016

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VIII. CLAIMS APPENDIX

1. (Previously presented) A composition useful for lithium ion batteries comprising:
discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active material ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

2. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise a lithium metal salt and an element selected from the group consisting of: iron, manganese, cobalt, copper, nickel, vanadium, titanium, and mixtures thereof.

3. (Previously presented) The composition of claim 2, wherein the lithium metal salt has an olivine crystal structure and wherein the lithium metal salt is $LiFePO_4$ or $LiMnPO_4$.

4. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise tin, silicon, copper, antimony, aluminum, germanium, titanium, or mixtures thereof.

5. (Cancelled).

6. (Original) The composition of claim 1, further comprising graphene or oxygenated graphene.

7. (Previously presented) The composition of claim 6, wherein the weight ratio of graphene to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

8. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level 1% to 15% percent by weight;

b) mixing the carbon nanotubes with a high boiling point liquid;

c) adding reagents in correct balance to synthesize a lithium salt;

d) reacting the mixture at a temperature to form the lithium salt while sonicating the mixture;

e) separating the solid discrete carbon nanotube salts from the liquid; and

f) drying and annealing the solid discrete carbon nanotube salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

9. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level of 1% to 15% by weight;

b) mixing the carbon nanotubes and a lithium salt in a liquid with surfactant;

c) sonicating the liquid carbon nanotube/lithium salt mixture;

d) separating the solid salts from the liquid; and

e) drying and annealing the solid discrete carbon nanotubes with attached lithium salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

10. (Previously presented) A composition useful for lithium ion batteries, comprising discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other

total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials ionically attached to their surface, and wherein the carbon nanotubes are in a weight ratio of carbon nanotubes to lithium salts of 0.1% to 10% and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

11. (Previously presented) A composition useful for lithium ion batteries, comprising oxidized discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials attached to their surface, and wherein the carbon nanotubes are uniformly dispersed without clustering on a dimension scale of less than about 1 micrometer and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

12. (Previously presented) A composition useful for lithium ion batteries, comprising uniformly dispersible oxidized , non-agglomerated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

13. (Original) The composition of claim 12, wherein the crystals or layers of lithium ion

active materials are chemically attached to the surface of the dispersible oxidized carbon nanotubes.

14. (Previously presented) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

15. (Previously presented) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

16. (Previously presented) The composition of claim 10 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

17. (Previously presented) The composition of claim 10 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

18. (Previously presented) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

19. (Previously presented) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

20. (Previously presented) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

21. (Previously presented) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

Electronic Acknowledgement Receipt

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First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
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New International Application Filed with the USPTO as a Receiving Office
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Clive P. Bosnyak, *et al.*
Serial No.:	13/529,797
Filed:	June 21, 2012
Art Unit:	1723
Examiner:	Phillip A. Stuckey
Conf. No.:	1004
For:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

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Alexandria, VA 22313-1450

REQUEST FOR EXTENSION FO TIME TO FILE APPEAL BRIEF UNDER 37 C.F.R.1.136

Applicant is in receipt of the Notice of Panel Decision from the Pre-Appeal Brief Review, mailed December 23, 2016. Applicant respectfully requests that the time for filing the Appeal Brief, which would have been due January 23, 2017, be extended one-month, until February 23, 2017. A one-month request for extension of time fee is included with this submission.

Applicant does not believe any other fee is necessary for this submission. However, if another fee is required, the Commissioner is hereby authorized to charge the required fee to the Andrews Kurth Kenyon LLP Deposit Account (referencing matter DENA-0008/223159). Any questions regarding this application should be directed to the attorney below.

Respectfully submitted,

/Gregory L. Porter/

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Date: January 23, 2017

Electronic Patent Application Fee Transmittal	
Application Number:	13529797
Filing Date:	21-Jun-2012
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Filer:	Gregory L. Porter/Jeanne Dunn
Attorney Docket Number:	DENA-0008 (223156)
Filed as Small Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 1 month with $0 paid	2251	1	100	100
Miscellaneous:				
		Total in USD ($)		**100**

Electronic Acknowledgement Receipt	
EFS ID:	28141944
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	23-JAN-2017
Filing Date:	21-JUN-2012
Time Stamp:	18:22:22
Application Type:	Utility under 35 USC 111(a)

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Payment was successfully received in RAM	$100
RAM confirmation Number	012417INTEFSW00006411500897
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Extension of Time	ReqExtTime_01232017.pdf	43836 2de580698121ee79e2e6d832dacfb4e4c1c46a4f	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31026 2f8e3489612dd8d15443a6a5635b140f96c3f60c	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	74862		

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New Applications Under 35 U.S.C. 111
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National Stage of an International Application under 35 U.S.C. 371
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New International Application Filed with the USPTO as a Receiving Office
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 01/20/2017

ANDREWS KURTH KENYON LLP
600 Travis Street
Suite 4200
Houston, TX 77002

EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
01/20/2017	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patenttrademarks@andrewskurth.com

Examiner-Initiated Interview Summary	Application No.	Applicant(s)	
	13/529,797	BOSNYAK ET AL.	
	Examiner	Art Unit	
	Philip A. Stuckey, PhD	1723	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Philip A. Stuckey*.

(2) *Milton Cano*.

(3) *Greg Porter*.

(4)_____.

Date of Interview: *10 January 2017*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1 and 3*.

Identification of prior art discussed: *Li 2006*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

See Continuation Sheet.

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

	/MILTON I CANO/ Supervisory Patent Examiner, Art Unit 1723

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Examiners Stuckey and Cano contacted Greg Porter in response to the interview earlier in the day with a re-review of the Finlayson declaration, the scope of the claims, and the teaching of the Li '2006 reference (primary reference in the 103 rejection). Mentioned in the previous interview but not as clearly convey, Examiner Stuckey pointed out that the Finlayson declaration only made a comment toward an intermediate process of forming the composition useful for lithium ion batteries, i.e. that the NMP would not form the claimed ionic attachment. The declaration did not address all aspects of the Li '2006 method, especially pertaining to the LiF6/EMC/DMC electrolyte (as addressed in the Final Rejection). Examiner Cano further indicated that with regards to the scope of the claim that the components positively claimed are taught by the prior art (ion active materials comprising migratable ions, discrete carbon nanotubes (claim 1) and LiFePO4 (claim 3); there does not appear to be any distinguishing features that precludes the prior art having the claimed ionic attachment. Mr. Porter indicated that the structure of the claims recites ionic attachment and this should be taken as a structural feature. In response, Examiner Stuckey indicated that the the limitation was considered and the conclusion was that there does not appear to be any distinguishing features; the declaration attempts to prove a distinguishing feature based on an intermediate step of forming the composition; Examiner Stuckey raised the question 'what in the instant disclosure causes the materials to be ionically attached?' Mr. Porter requested time to review and consider and indicated that the method need not be defined in the strucutre of the claims. Examiners do not disagree and do not recommend product-by-process limitations in the claims, but the declaration attempts to indicate that there is a structural difference because of the intermediate steps in the method, so 'what disclosed method step results in such structural differences?'; such structural differences are not apparent in the instant claims. This information could be helpful in advancing prosecution.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 01/17/2017

ANDREWS KURTH KENYON LLP
600 Travis Street
Suite 4200
Houston, TX 77002

EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
01/17/2017	ELECTRONIC

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patenttrademarks@andrewskurth.com

Applicant-Initiated Interview Summary	**Application No.** 13/529,797	**Applicant(s)** BOSNYAK ET AL.	
	Examiner Philip A. Stuckey, PhD	**Art Unit** 1723	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Philip A. Stuckey*.

(2) *Milton Cano*.

(3) *Gregory Porter*.

(4) *Steve Krupp*.

Date of Interview: *10 January 2017*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1 and 3*.

Identification of prior art discussed: *of record*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

See Continuation Sheet.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/Philip A. Stuckey/ Examiner, Art Unit 1723	/MILTON I CANO/ Supervisory Patent Examiner, Art Unit 1723

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

———

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments:

The applicant's representative, Gregory Porter, inquired about the outcome of the pre-appeal. Examiner Cano explained the process used in the conference. Mr. Porter wanted to ensure that the declarations were considered. Mr. Porter was ensured that the declarations were considered by Examiners Stuckey and D'Aniello and addressed in the most recent final rejection. While the declarations were relevant in the pre-appeal conference, full re-consideration of the declarations themselves were not discussed during the conference; the remarks submitted with the pre-appeal brief were the focus of the discussion. Mr. Porter wanted to ensure that full consideration was given to the ionic attachment aspects of the declaration of Dr. Malcom Finlayson. Examiner's Stuckey and Cano offered to revisit the declaration to ensure that the declaration was properly marked as defective in the final office action and would return a call by the next day.

The claimed scope was discussed with regards to the materials used; it was indicated by Examiner Cano that the claims were generic in the recitation of the materials. Mr. Porter pointed to specific materials of claim 3; the prior art does teach those specific materials.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Clive P. Bosnyak, *et al.*
Serial No.:	13/529,797
Filed:	June 21, 2012
Art Unit:	1723
Examiner:	Phillip A. Stuckey
Conf. No.:	1004
For:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

Mail Stop Response
Commissioner for Patents
Box AF
P.O. Box 1450
Alexandria, VA 22313-1450

JANUARY 11, 2017 INTERVIEW SUMMARY

An interview was held on January 11, 2017. Examiner Phillip Stuckey and Supervisory Patent Examiner Milton Cano participated on behalf of the USPTO. Applicant's outside counsel Gregory L. Porter, Applicant's Chief IP Counsel Stephen Krupp, and senior scientist Dr. Malcolm Finlayson participated on behalf of Applicant. The parties discussed the instant claims, the Li reference, and Dr. Finlayson's May 18, 2016 declaration. No agreement was reached.

Specifically, Applicant discussed paragraphs 4 and 5 of Dr. Finlayson's declaration and why the asserted obviousness combination lacked the claimed composition's structural feature of being "ionically attached." Dr. Finlayson explained in detail the technical reasons why no ions can be present in Li according to the peer reviewed literature cited in his declaration. Since Li lacks ions, Dr. Finlayson explained that the science dictates that there can be no "ionic attachment" in Li as expressly required by the instant claims. Dr. Finlayson stated that the instant specification describes at, for example, paragraph 44 one way in which the instant application yields ions for "ionic

attachment" and that Table 1 in paragraph 46 showed the advantageous properties of a composition that had "ionic attachment" like the claims vs. one like Li that did not.

Examiner Stuckey and Supervisory Patent Examiner Cano expressed that they understood the science and did not disagree with Dr. Finlayson's explanation of Li or the instant application. Supervisory Patent Examiner Cano asserted that the claims were not commensurate in scope with the arguments. Applicant's attorney pointed to numerous references in claim 1 to "ion(s)" and "ionically attached" and asked if those terms were not being given weight in considering claim scope. Supervisory Patent Examiner Cano said those limitations "were given all the weight in the world" but the claim language did not adequately distinguish from Li. Applicant's attorneys inquired as to what was inadequate about the language but did not receive an explanation that was understandable to Applicant's attorneys.

Examiner Stuckey suggested that he might make a new rejection after a new search as part of an Examiner's Answer on appeal or even after a successful appeal by Applicant. Supervisory Patent Examiner Cano said to proceed to appeal on the instant rejection without new rejections or claim amendments. Applicants thanked the examiners for their time.

The Examiner is invited to call the undersigned attorney at 713-220-4621 if there is additional information that should be included here or if a telephone call could help resolve any item.

Respectfully submitted,

/Gregory L. Porter/

Gregory L. Porter
Registration No. 40,131

January 11, 2017

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Electronic Acknowledgement Receipt

EFS ID:	28036474
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	11-JAN-2017
Filing Date:	21-JUN-2012
Time Stamp:	15:47:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant summary of interview with examiner	InterviewSummary_01112017.pdf	28074 5532c5b639fdec02b92890c1f7f7707c6a616173	no	2

Warnings:

Information:	
Total Files Size (in bytes):	28074

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New International Application Filed with the USPTO as a Receiving Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 12/23/2016

ANDREWS KURTH KENYON LLP
600 Travis Street
Suite 4200
Houston, TX 77002

EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

MAIL DATE	DELIVERY MODE
12/23/2016	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of Panel Decision from Pre-Appeal Brief Review	Application No. 13/529,797	Applicant(s) BOSNYAK ET AL.
	Examiner Philip A. Stuckey, PhD	Art Unit 1723

This is in response to the Pre-Appeal Brief Request for Review filed 11 November, 2016.

1. ☐ **Improper Request** – The Request is improper and a conference will not be held for the following reason(s):

☐ The Notice of Appeal has not been filed concurrent with the Pre-Appeal Brief Request.
☐ The request does not include reasons why a review is appropriate.
☐ A proposed amendment is included with the Pre-Appeal Brief request.
☐ Other: .

The time period for filing a response continues to run from the receipt date of the Notice of Appeal or from the mail date of the last Office communication, if no Notice of Appeal has been received.

2. ☒ **Proceed to Board of Patent Appeals and Interferences** – A Pre-Appeal Brief conference has been held. The application remains under appeal because there is at least one actual issue for appeal. Applicant is required to submit an appeal brief in accordance with 37 CFR 41.37. The time period for filing an appeal brief will be reset to be one month from mailing this decision, or the balance of the two-month time period running from the receipt of the notice of appeal, whichever is greater. Further, the time period for filing of the appeal brief is extendible under 37 CFR 1.136 based upon the mail date of this decision or the receipt date of the notice of appeal, as applicable.

☒ The panel has determined the status of the claim(s) is as follows:
Claim(s) allowed: *none*.
Claim(s) objected to: *none*.
Claim(s) rejected: *1-4,6-21*.
Claim(s) withdrawn from consideration: *8-9*.

3. ☐ **Allowable application** – A conference has been held. The rejection is withdrawn and a Notice of Allowance will be mailed. Prosecution on the merits remains closed. No further action is required by applicant at this time.

4. ☐ **Reopen Prosecution** – A conference has been held. The rejection is withdrawn and a new Office action will be mailed. No further action is required by applicant at this time.

All participants:		
(1) *Philip A. Stuckey*.		(3) *Milton I Cano*.
(2) *Richard Crispino*.		(4)_____.
/Philip A. Stuckey/ Examiner, Art Unit 1723	/RICHARD CRISPINO/ Supervisory Patent Examiner, Art Unit 1700	/MILTON I CANO/ Supervisory Patent Examiner, Art Unit 1723

PRE-APPEAL BRIEF

Claims 1-4, 6-7, and 10-21 stand rejected as obvious over the primary reference of Li et al., ('A novel network composite cathode of LiFePO4/multiwalled carbon nanotubes with high rate capability for lithium ion batteries, Electrochemistry Communications, 9:4, April 2007, pp. 663-666, herein referred to as "Li"). As described below, the Li rejections are technically and legally flawed as pointed out in the last response and evidentiary declarations. The declarations and their scientific reasoning have been ignored in the conclusory final rejection. The flawed rejections should be withdrawn without Applicant having to proceed to appeal.

I. Sworn Declarations and Peer Reviewed Literature Unequivocally Prove that Li Does Not and Cannot Have "Crystals or Layers of Lithium Ion Active Material Ionically Attached" to the Surface of Nanotubes as Required by the Claims

The claims require discrete carbon nanotubes that "have crystals or layers of lithium ion active material ionically attached to their surfaces." The Declaration of Dr. Finlayson, previously submitted, conclusively proved that Li does not disclose carbon nanotubes with "crystals or layers of lithium ion active material ionically attached to their surface" as required by the claims. Reviewing the teachings of Li and other literature, Dr. Finlayson concluded that even "an ordinarily skilled person in the art would understand that Li's MWCNTs do not have any form of lithium ion active material (or anything else) ionically attached to their surface." (Finlayson Decl., para. 4).

Dr. Finlayson based his conclusion on the indisputable scientific fact that it is axiomatic that for any ionic attachment to occur there "necessarily needs to be ions present". (Finlayson Decl., para. 5). As Dr. Finlayson outlined in his sworn declaration, it "is well-known and described in the literature" that "$LiFePO_4$ does not dissolve in the solvent employed in Li, i.e., N-methyl-2-pyrolidone (NMP). (Finlayson Decl., para. 5). As documentary evidence for this

conclusion Dr. Finlayson cited the peer reviewed literature reference of Nanotechnology for Lithium-Ion Batteries by Abu-Lebdeh et al. which unequivocally states "we can conclude that the LiF eP04 does not react with this product [NMP]."

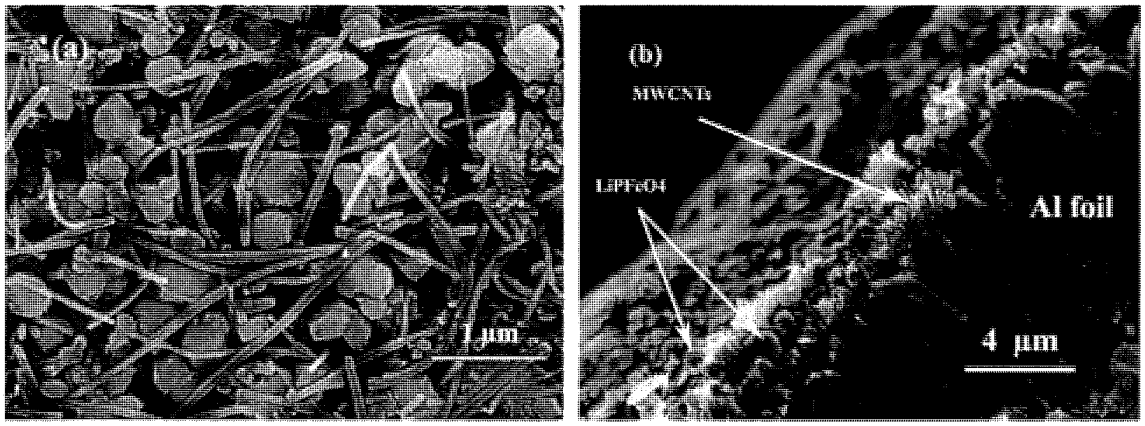
Dr. Finlayson has specifically described the scientific basis and provided indisputable peer-reviewed evidence in support of his conclusion that there are no ions present in Li and Li "would not result in carbon nanotubes with "crystals or layers of lithium ion active material ionically attached to their surface" as required by independent Claims 1, 10, 11, and 12." (Finlayson Decl., para. 5). Instead of addressing the declaration and peer-reviewed evidence provided or providing counter evidence, the Final Office Action simply cites to Li, p. 664 last paragraph and argues the "$LiFeP0_4$ of Li 2006 does undergo a process in which the lithium ion active material of Li 2006 is exposed to a ionic environment ($LiPF_6$/EMC/DMC electrolyte) when the cathode slurry is applied to the Al foil." However, the Li paragraph cited in the Office Action is the same paragraph that Dr. Finlayson was referring to that uses an N-methyl-2-pyrrolidone (NMP) solvent and therefore cannot react with $LiFeP0_4$ to form ions leading to ionic attachments.

The Final Office Action also cites to Figure 2 stating, "Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2." The Final Office Action offers no support or reasoning for this conclusory statement. As a fundamental scientific principle Figure 2 simply does not and cannot teach or suggest ionic attachment of any kind. That is, the unrebutted evidence proves that $LiFeP0_4$ does not dissolve Li's NMP solvent, $LiFeP0_4$ therefore cannot form ions, and $LiFeP0_4$ therefore cannot form ionic attachments.

The secondary reference of Niu does not remedy Li's deficiency as it does not even relate to lithium ion active materials.[1] Therefore, the claims cannot be rendered obvious because the suggested combination does not and cannot yield carbon nanotubes with "crystals or layers of lithium ion active material ionically attached to their surface" as required by independent Claims 1, 10, 11, and 12.

II. Li Does not Teach or Suggest Discrete, Non-Agglomerated, and Exfoliated Carbon Nanotubes as Required by the Claims

The Final Office Action states that the rejection relies upon the Li reference as teaching nanotubes that are discrete, non-agglomerated, and exfoliated. However, the Li reference does not teach or suggest the claimed "discrete, non-agglomerated, and exfoliated carbon nanotubes" in any way. This is confirmed, as shown below, by Li's own SEM images, wherein one cannot ascertain two ends of even a single nanotube due to the agglomeration and entanglement of the nanotubes.



Because the Li SEM images show agglomerated, entangled nanotubes the Final Office Action resorts to asserting that somehow the Broadest Reasonable Interpretation (BRI) standard

[1] The Office Action refers to MPEP section 2112.01 which relates to when the structure of a reference is substantially identical to that of the claims. However, that MPEP section is inapposite here wherein the claimed structure is substantially different from Li due to the claimed structure having ionic attachment.

means that Li teaches discrete, non-agglomerated, and exfoliated nanotubes. However, "[e]ven under the broadest reasonable interpretation, [a] construction cannot be divorced from the specification and the record evidence, and must be consistent with the one that those skilled in the art would reach." *Microsoft Corp. v. Proxyconn*, 789 F.3d 1292, 1297 (Fed. Cir. 2015). A construction that "discrete, non-agglomerated, and exfoliated nanotubes" can include agglomerated, entangled, non-individualized nanotubes is simply not reasonable.

The sole explanation provided for the Office Action's conclusory BRI assertion is that the nanotubes of Li "are considered discrete and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture." (Office Action page 6). The relevant portion of Li states:

"The cathode slurry was prepared by mixing LiFePO4, polyvinylidone difluoride (PVDF) and acetylene black or MWCNTs in the weight ratio of 90:5:5 in N-methyl-2-pyrrolidone (NMP) solvent." (Li, page 664).

There is no scientific evidence or explanation provided in the Office Action as to how mere "mixing" of LiFePO4, polyvinylidone difluoride (PVDF) and MWCNTs would somehow lead to the nanotubes being "discrete, non-agglomerated, and exfoliated" as is required by the claims. The instant specification clearly describes "discrete" nanotubes as being "individual uniformly dispersed tubes." Even under the BRI standard, a construction that "discrete, non-agglomerated, and exfoliated nanotubes" can include agglomerated, entangled, non-individualized nanotubes is simply not reasonable. In sum, an ordinarily skilled artisan, upon seeing Li, Figure 2, would immediately understand that the nanotubes of Li are not "discrete, non-agglomerated, and exfoliated" as is required by the claims.

III. The Rejections Lack Logic, Sound Scientific Principle, and Evidentiary Support

As detailed above, the rejections are not based on logic or sound scientific principle. This is contrary to the guidance provided in the MPEP. As but one example, **MPEP 2144.02 Reliance on Scientific Theory** states in pertinent part that "when an examiner relies on a scientific theory, evidentiary support for the existence and meaning of that theory must be provided." The conclusory final rejections without evidentiary support violate this basic tenet of examination procedure and should be withdrawn without need for an appeal.

IV. Conclusion

Applicant is unaware of any authority that allows the USPTO to rely on unsupported conclusory statements as grounds for a rejection when the conclusory statements are directly contradicted by sworn declarations and peer-reviewed literature. The instant rejections are improper in that they ignore definitive scientific evidence that Li cannot have "ionically attached lithium ion active material". Furthermore, in speculating that under BRI Li somehow teaches discrete, non-agglomerated, and exfoliated carbon nanotubes the Office Action ignores the clear disclosure of Li, Figure 2, and the language of the instant specification.

For at least the reasons describe above, all rejections should be withdrawn and the claims allowed without an appeal.

Respectfully submitted,
/Gregory L. Porter/

November 11, 2016

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CLAIMS APPENDIX

1. (Previously presented) A composition useful for lithium ion batteries comprising:
discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active material ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

2. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise a lithium metal salt and an element selected from the group consisting of: iron, manganese, cobalt, copper, nickel, vanadium, titanium, and mixtures thereof.

3. (Previously presented) The composition of claim 2, wherein the lithium metal salt has an olivine crystal structure and wherein the lithium metal salt is $LiFePO_4$ or $LiMnPO_4$.

4. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise tin, silicon, copper, antimony, aluminum, germanium, titanium, or mixtures thereof.

5. (Cancelled).

6. (Original) The composition of claim 1, further comprising graphene or oxygenated graphene.

7. (Previously presented) The composition of claim 6, wherein the weight ratio of graphene to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

8. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level 1% to 15% percent by weight;

b) mixing the carbon nanotubes with a high boiling point liquid;

c) adding reagents in correct balance to synthesize a lithium salt;

d) reacting the mixture at a temperature to form the lithium salt while sonicating the mixture;

e) separating the solid discrete carbon nanotube salts from the liquid; and

f) drying and annealing the solid discrete carbon nanotube salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

9. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level of 1% to 15% by weight;

b) mixing the carbon nanotubes and a lithium salt in a liquid with surfactant;

c) sonicating the liquid carbon nanotube/lithium salt mixture;

d) separating the solid salts from the liquid; and

e) drying and annealing the solid discrete carbon nanotubes with attached lithium salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

10. (Previously presented) A composition useful for lithium ion batteries, comprising discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials ionically attached to their surface, and wherein the carbon nanotubes are in a weight ratio of carbon nanotubes to

lithium salts of 0.1% to 10% and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

11. (Previously presented) A composition useful for lithium ion batteries, comprising oxidized discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials attached to their surface, and wherein the carbon nanotubes are uniformly dispersed without clustering on a dimension scale of less than about 1 micrometer and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

12. (Previously presented) A composition useful for lithium ion batteries, comprising uniformly dispersible oxidized , non-agglomerated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

13. (Original) The composition of claim 12, wherein the crystals or layers of lithium ion active materials are chemically attached to the surface of the dispersible oxidized carbon nanotubes.

14. (Previously presented) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

15. (Previously presented) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

16. (Previously presented) The composition of claim 10 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

17. (Previously presented) The composition of claim 10 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

18. (Previously presented) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

19. (Previously presented) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

20. (Previously presented) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

21. (Previously presented) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

Electronic Patent Application Fee Transmittal

Application Number:	13529797
Filing Date:	21-Jun-2012
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Filer:	Gregory L. Porter/Jeanne Dunn
Attorney Docket Number:	DENA-0008 (223156)

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
NOTICE OF APPEAL	2401	1	400	400
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**400**

Electronic Acknowledgement Receipt	
EFS ID:	27489468
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	11-NOV-2016
Filing Date:	21-JUN-2012
Time Stamp:	16:41:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$400
RAM confirmation Number	111416INTEFSW00012982500897
Deposit Account	
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Notice of Appeal Filed	NoticeAppeal.pdf	215071 926574f942adba82580c48e58d7b9939335611f7	no	2
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	PreAppealBriefRequest.pdf	189637 49d5ca0537af30ea20745ed89e7c399701328da0	no	2
Warnings:					
Information:					
3	Miscellaneous Incoming Letter	PreAppealReqReview.pdf	15975 1a09c1d3e65431cd9c140fe91853e9c6f2122b2e	no	1
Warnings:					
Information:					
4	Appeal Brief Filed	PreAppealBrief.pdf	91835 eb09dff94da79614e8918658d95068b7d24a77da	no	5
Warnings:					
Information:					
5	Affidavit/Dec/Exhibit after Notice of Appeal	ClaimsAppendix.pdf	43033 108db732e7dff900a7be0c11c8cd21358af94ae0	no	4
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	30633 8beb589aa3cf74c5dd3c94069f47689ee250af90	no	2
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/31 (03-14)
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NOTICE OF APPEAL FROM THE EXAMINER TO THE PATENT TRIAL AND APPEAL BOARD

Docket Number (Optional): DENA-0008(223156)

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on _____.

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In re Application of: Clive P. Bosnyak

Application Number	Filed
13/529,797	2012-06-21

For: Lithium Ion Batteries Using Discrete Carbon Nanotubes....

Art Unit	Examiner
1723	Philip A. Stuckey

Applicant hereby **appeals** to the Patent Trial and Appeal Board from the last decision of the examiner.

The fee for this Notice of Appeal is (37 CFR 41.20(b)(1)) $ 800.00

☑ Applicant asserts small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by 50%, and the resulting fee is: $ 400.00

☐ Applicant certifies micro entity status. See 37 CFR 1.29. Therefore, the fee shown above is reduced by 75%, and the resulting fee is: $ _____
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 500897.

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☐ A petition for an extension of time under 37 CFR 1.136(a) (PTO/AIA/22 or equivalent) is enclosed.
For extensions of time in reexamination proceedings, see 37 CFR 1.550.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant

☑ attorney or agent of record
Registration number 40131

☐ attorney or agent acting under 37 CFR 1.34
Registration number _____

Signature /Gregory L. Porter/

Typed or printed name Gregory L. Porrter

Telephone Number 713.220.4621

Date 2016-11-11

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☑ * Total of 1 forms are submitted.

This collection of information is required by 37 CFR 41.20(b)(1) and 41.31. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional)
DENA-0008 (223156)

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Application Number	Filed
13/529,797	2012-06-21

First Named Inventor: Clive P. Bosnyak

Art Unit	Examiner
1723	Philip A. Stuckey

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).
Note: No more than five (5) pages may be provided.

I am the

☐ applicant.

☑ attorney or agent of record. Registration number 40131.

☐ attorney or agent acting under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

/Gregory L. Porter/
Signature

Gregory L. Porter
Typed or printed name

713.220.4621
Telephone number

2016-11-11
Date

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☑ *Total of 1 forms are submitted.

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

DOCKET NO. 223156 (MRE008NP)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Clive P. Bosnyak

SERIAL NO.: 13/529,797

ART UNIT: 1723

EXAMINER: Phillip A. Stuckey

CONFIRMATION NO.: 1004

FILING DATE: June 21, 2012

FOR: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

PRE-APPEAL BRIEF REQUEST FOR REVIEW

COMMISSIONER FOR PATENTS
PO BOX 1450
ALEXANDRIA, VA 22313-1450

SIR:

Applicant requests review of the August 19, 2016 Final Office Action rejection in the above-identified application. No amendments are being filed with this request. This request is being filed with a Notice of Appeal and the proper form for pre-appeal brief request for review. The review is requested for the reasons stated in the attached five page pre-appeal brief. A Claims Appendix is attached for convenience.

Any fee required for the notice of appeal, extension of time, entry of this paper, or to avoid abandonment of this application, may be charged to Deposit Account No. 50-0897 referencing attorney docket no. 223156 (MRE008NP). The Examiner or his supervisor is invited to call the undersigned attorney at 713-220-4621, if a telephone call could help resolve any item.

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Andrews Kurth LLP
600 Travis Street
Suite 4200
Houston, TX 77002

Courtesy Reminder for
Application Serial No: 13/529,797

Attorney Docket No: DENA-0008 (223156)
Customer Number: 130577
Date of Electronic Notification: 08/19/2016

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
patenttrademarks@andrewskurth.com

To view your correspondence online or update your email addresses, please visit us anytime at **https://sportal.uspto.gov/secure/myportal/privatepair.** If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 08/19/2016

Andrews Kurth LLP
600 Travis Street
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Houston, TX 77002

EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
08/19/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patenttrademarks@andrewskurth.com

Office Action Summary	Application No. 13/529,797	Applicant(s) BOSNYAK ET AL.	
	Examiner Philip A. Stuckey, PhD	Art Unit 1723	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05/18/2016*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-4 and 6-21* is/are pending in the application.

5a) Of the above claim(s) *8 and 9* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-4,6,7 and 10-21* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *05/12/2016* .

4) ☐ Other: _____.

DETAILED ACTION

The present application is being examined under the pre-AIA first to invent provisions. Claims 1-4 and 6-21 are pending; claims 8-9 are withdrawn.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Priority

As noted previously, the examiner does not find support for the instant claims in provisional application 61/500,560 and accordingly, the claims are not entitled to the benefit date of the provisional application but rather toward the filing date of the instant application on 21 June 2012.

Information Disclosure Statement

The information disclosure statement(s) filed has/have been considered by the examiner.

Oath/Declaration

The declaration of Dr. Nancy Henderson (not directly filed under 37 CFR 1.132) filed 05/18/2016 is insufficient to overcome the rejection of record based upon prior art rejection (maintained herein) as set forth in the last Office action because:

In response to applicant's argument that the nanotubes of Niu are not discrete, non-agglomerated, and exfoliated, this point is considered moot because the Li 2006 reference, which is the primary reference in rejection under 35 USC 103, is relied upon for this teaching. Figure 2 of Li is reproduced below, which under the broadest reasonable interpretation, does teach discrete, non-agglomerated, and exfoliated, as asserted by the office. The applicant is also reminded that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. In response to applicant's argument that the nanotubes of Niu are not discrete, non-agglomerated, and exfoliated, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

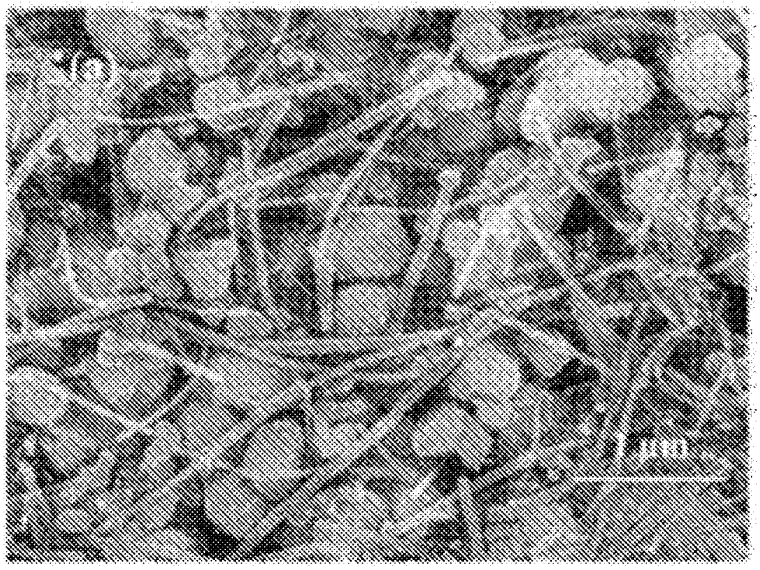


Fig. 2. SEM images of $LiFePO_4$/MWCNTs comp

The declaration of Dr. Malcolm Finlayson (not directly filed under 37 CFR 1.132) filed 05/18/2016 is insufficient to overcome the rejection of record based upon prior art rejection (maintained herein) as set forth in the last Office action because:

The $LiFePO_4$ of Li 2006 does undergo a process in which the lithium ion active material of Li 2006 is exposed to a ionic environment ($LiPF_6$/EMC/DMC electrolyte) when the cathode slurry is applied to the Al foil; see page 664, last paragraph of Experimental section; this teaching contradicts the declaration as indicated in section 5 with regards to there being ‘no ionic environment with NMP solvent' as consideration has not been given to the entire disclosed method of Li 2006.

Response to Arguments

Applicant's arguments filed 05/18/2016 have been fully considered but they are not persuasive.

The applicant's arguments directed toward the declarations have been addressed above. While the applicant has been encouraged to submit evidence and/or arguments showing that there is a difference between the prior art and the instant claims regarding ionic attachment, such persuasive arguments have not been made.

Of further note for consideration, comparisons of $LiFePO_4$ is a specifically from the applicant's disclosure to the prior art are not in scope with broad genus claim of crystals or layers of lithium ion active material. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The applicant is reminded that in prosecution, the claims are given their broadest reasonable interpretation; lacking further positively claimed structural elements, the claimed 'discrete, non-agglomerated, and exfoliated carbon nanotubes' as claimed are taught by the prior art as noted herein; these claims is not descriptive enough to teach beyond the prior art.

MAINTAINED: Claim Rejections - 35 USC § 103

Claims 1-4 and 10-21 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Li et al., *A novel network composite cathode of*

LiFePO4/multiwalled carbon nanotubes with high rate capability for lithium ion batteries, Electrochemistry Communications, Volume 9, Issue 4, April 2007, Pages 663-666, herein referred to as "Li 2006" in view of Niu et al., US 7,070,753 B2, herein referred to as Niu '753.

As to **claim 1**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, see e.g. Section 4. Conclusions. Li 2006 further teaches discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface (MWCNTs with surfaces, see figure 2, which are considered discrete and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials with e.g. lithium migratable ions which are considered layered as instantly claimed, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 is a point which falls within the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1 and thus anticipates the claimed range. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2.

Li 2006 does not teach the oxidized species, aspect ratio, and oxidation level of the carbon nanotubes.

Niu '753 teaches disassembled (disentangled) discrete carbon nanotubes that have an oxygen content of 3.8% (column 6, lines 41-44, Table 5), which is considered the oxidation level. Niu '753 further teaches nanotubes include those having a length to diameter ratio of greater than 5 (column 8, lines 34-40). This teaching of Niu teaches an aspect ratio of 5 or greater which establishes a prima facie case of obviousness as it encompasses the claimed range. See MPEP 2144.05 regarding the Obviousness of Ranges. Niu '753 further teaches the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone or hydroxyl functionalities (see col 10 lines 4-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use disassembled discrete carbon nanotubes with carboxylic, ketone or hydroxyl functionalities and increased oxygen content in the invention of Li 2006 because Niu discloses that an increase in oxygen content can also improve density of the material (column 14, lines 66-67). It also would have been obvious to one of ordinary skill in the art at the time of the invention to use the aspect ratio as taught by Niu for the carbon nanotubes of Li 2006 because one would want a sufficient aspect ratio for binding to the materials in the electrode. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Regarding the ionically attached surface of the discrete carbon nanotubes having layers of lithium ion active material ionically attached to their surface, the prior art teaches the structure and materials of the composition as instantly claimed and it is therefore expected that the same ionic attachment is present in the prior art.

See MPEP Section 2112.01 I. PRODUCT AND APPARATUS CLAIMS - WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, **the applicant has the burden of showing that they are not.**" In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

As to **claims 2 and 3**, Li 2006 teaches $LiFePO_4$ which is a lithium metal salt having and element selected from the group consisting of iron, having an olivine crystal structure, and the lithium metal salt is $LiFePO_4$.

As to **claim 4**, Li 2006 teaches the loading of the $LiFePO_4$ on Al foil (see page 664 second column second paragraph) which teaches the layers of lithium ion active material comprise aluminum as instantly claimed.

As to **claim 10**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, See e.g. Section 4. Conclusions. Li 2006 further teaches discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface (MWCNTs with surface, see figure 2, which are considered discrete, non-agglomerated, and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials which is considered a layer as instantly claimed with e.g. lithium migratable ions, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 teaches the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2.

Li 2006 teaches the cell contains 1 molar $LiPF_6$, which is a lithium salt, in the electrolyte (see page 664 second column second paragraph) which penetrates the positive electrode to provide an ionic pathway within the

electrochemical cell. Li 2006 further teaches that the ratio of the carbon nanotubes in the cathode is in a weight ratio of 5% to the total cathode slurry weight and that the cathode is dissolved in NMP solvent (see page 664 second column second paragraph). It is readily seen from this teaching that the weight ratio of carbon nanotubes is low in comparison to the total weight of the cathode active material.

Li 2006 does not teach the weight ratio of the carbon nanotubes to the the weight ratio of the lithium salts, but rather Li 2006 teaches the concentration of lithium salts to carbon nanotubes and that this ratio is relatively low in comparison; thus this teaching of Li 2006 establishes a prima facie case of obviousness regarding the claimed ranges for a weight ratio of carbon nanotubes to lithium salts of 0.1% to 10%. See MPEP 2144.05 regarding the Obviousness of Ranges. It is well known that one desires a low solution resistance to prevent losses. Furthermore, one of ordinary skill in the art would be able to determine through routine experimentation the optimal weight ratio of carbon nanotubes to lithium salts and could arrive at 0.1% to 10% to decrease the solution resistance of a lithium ion battery. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Li 2006 does not teach the oxidized species, aspect ratio, and oxidation level of the carbon nanotubes.

Niu ‘753 teaches disassembled (disentangled) discrete carbon nanotubes that have an oxygen content of 3.8% (column 6, lines 41-44, Table 5), which is

considered the oxidation level. Niu '753 further teaches nanotubes include those having a length to diameter ratio of greater than 5 (column 8, lines 34-40). This teaching of Niu teaches an aspect ratio of 5 or greater which establishes a prima facie case of obviousness as it encompasses the claimed range. See MPEP 2144.05 regarding the Obviousness of Ranges. Niu '753 further teaches the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone or hydroxyl functionalities (see col 10 lines 4-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use disassembled discrete carbon nanotubes with carboxylic, ketone or hydroxyl functionalities and increased oxygen content in the invention of Li 2006 because Niu discloses that an increase in oxygen content can also improve density of the material (column 14, lines 66-67). It also would have been obvious to one of ordinary skill in the art at the time of the invention to use the aspect ratio as taught by Niu for the carbon nanotubes of Li 2006 because one would want a sufficient aspect ratio for binding to the materials in the electrode. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Regarding the ionically attached surface of the discrete carbon nanotubes having layers of lithium ion active material ionically attached to their surface, the prior art teaches the structure and materials of the composition as instantly claimed and it is therefore expected that the same ionic attachment is present in the prior art.

See MPEP Section 2112.01 I. PRODUCT AND APPARATUS CLAIMS - WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, **the applicant has the burden of showing that they are not.**" In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

As to **claim 11**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, See e.g. Section 4. Conclusions. Li 2006 further teaches discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface (MWCNTs with surface, see figure 2, which are considered discrete and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials with e.g. lithium migratable ions, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of

90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 is a point which falls within the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1 and thus anticipates the claimed range. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface and wherein the carbon nanotubes are uniformly dispersed without clustering on a dimension scale of less than about 1 micrometer, see figures 2a and 2b which shows the MWCNTs on a dimension scale of 1 micron in 2a being uniformly dispersed without clustering.

Li 2006 does not teach the oxidized species, aspect ratio, and oxidation level of the carbon nanotubes.

Niu '753 teaches disassembled (disentangled) discrete carbon nanotubes that have an oxygen content of 3.8% (column 6, lines 41-44, Table 5), which is considered the oxidation level. Niu '753 further teaches nanotubes include those having a length to diameter ratio of greater than 5 (column 8, lines 34-40). This teaching of Niu teaches an aspect ratio of 5 or greater which establishes a prima facie case of obviousness as it encompasses the claimed range. See MPEP 2144.05 regarding the Obviousness of Ranges. Niu '753 further teaches the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone or hydroxyl functionalities (see col 10 lines 4-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use disassembled discrete carbon nanotubes with carboxylic, ketone or hydroxyl functionalities and increased oxygen content in the invention of Li 2006 because Niu discloses that an increase in oxygen content can also improve density of the material (column 14, lines 66-67). It also would have been obvious to one of ordinary skill in the art at the time of the invention to use the aspect ratio as taught by Niu for the carbon nanotubes of Li 2006 because one would want a sufficient aspect ratio for binding to the materials in the electrode. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

As to **claim 12**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, See e.g. Section 4. Conclusions. Li 2006 further teaches oxidized, non-agglomerated, carbon nanotubes having a surface (MWCNTs with surface, see figure 2 and the first paragraph of the Experimental section on page 664), which are considered oxidized because they are washed with nitric acid).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials with e.g. lithium migratable ions, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a

normalized ratio of 18:1. Li 2006's ratio of 18:1 is an anticipatory point which falls within the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2.

Li 2006 does not teach the oxidized species, aspect ratio, and oxidation level of the carbon nanotubes.

Niu '753 teaches disassembled (disentangled) discrete carbon nanotubes that have an oxygen content of 3.8% (column 6, lines 41-44, Table 5), which is considered the oxidation level. Niu '753 further teaches nanotubes include those having a length to diameter ratio of greater than 5 (column 8, lines 34-40). This teaching of Niu teaches an aspect ratio of 5 or greater which establishes a prima facie case of obviousness as it encompasses the claimed range. See MPEP 2144.05 regarding the Obviousness of Ranges. Niu '753 further teaches the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone or hydroxyl functionalities (see col 10 lines 4-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use disassembled discrete carbon nanotubes with carboxylic, ketone or hydroxyl functionalities and increased oxygen content in the invention of Li 2006 because Niu discloses that an increase in oxygen content can also improve density of the material (column 14, lines 66-67). It also would have been obvious to one of ordinary skill in the art at the time of the invention to

use the aspect ratio as taught by Niu for the carbon nanotubes of Li 2006 because one would want a sufficient aspect ratio for binding to the materials in the electrode. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Regarding the ionically attached surface of the discrete carbon nanotubes having layers of lithium ion active material ionically attached to their surface, the prior art teaches the structure and materials of the composition as instantly claimed and it is therefore expected that the same ionic attachment is present in the prior art.

See MPEP Section 2112.01 I. PRODUCT AND APPARATUS CLAIMS - WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, **the applicant has the burden of showing that they are not.**" In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

As to **claim 13**, Li 2006 teaches the discrete carbon nanotubes having layers of lithium ion active material are attached to their surface, see figure 2.

Li 2006 teaches the product as instantly claimed. The limitation regarding chemical attachment does not impart additional structural or chemical limitations that distinguish the instant claims from that of the prior art.

Furthermore, it is inherent that Van der Waals forces exist between the materials of Li 2006 which teaches chemical attachment as instantly claimed.

As to **claims 14 and 15**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1 which anticipates the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

As to **claims 16 and 17**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1 which teaches the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

As to **claims 18 and 19**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1 which anticipates the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

As to **claims 20 and 21**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1 which anticipates the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

Claims 6 and 7 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Li 2006 in view of Niu '753 and in further view of Zhamu et al., US 2010/0176337 A1, herein referred to as Zhamu '337.

As to **claims 6 and 7**, Li 2006 teaches the composition of claim 1.

Li 2006 does not teach the composition further comprising graphene or oxygenated graphene and wherein the weight ratio of grapheme to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

Zhamu '337 teaches graphene reinforced composite electrode for lithium ion batteries (see e.g. title and abstract). Zhamu '337 further teaches that the graphene platelets occupy a weight fraction of 2% to 50% of the total nanocomposite weight (see [0089]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the graphene weight fraction as taught by Zhamu '337 in the the nanocomposite mixture of Li 2006 because Zhamu '337 teaches that the graphene reinforces the electrode.

Applicant has not addressed, maintained-Double Patenting

Applicant is advised that should claims 1, 10, 11, or 12 be found allowable, the other of claims 1, 10, 11, and 12 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

The differences in the discrete, dispersible, etc. descriptions used to describe the carbon nanotubes do not recite a clear distinction as presently claimed. Furthermore, claim 10 differs in the weight ratio of carbon nanotubes to lithium salts which would be an obvious variant based upon Li 2006's teaching regarding the concentration of lithium salts to carbon nanotubes as discussed with claim 10 above.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s).

See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/forms/. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal

Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claim 1 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1- of U.S. Patent No. 8,808,909. Although the claims at issue are not identical, they are not patentably distinct from each other because:

Claim 1 of the 8,808,909 recites

> A composition useful for lithium ion batteries comprising: discrete carbon nanotubes having crystals or layers of lithium ion active material attached to their surface, wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

This claim is broader in scope than instant independent claims 1, 10, 11, and 12 and identically recites the claimed ranges of the aspect ratio and oxidation levels of the carbon nanotubes as well as claiming the crystal/material layers.

Claim 2 of the 8,808,909 and instant claim 4 recite the same group elements for the crystals/layers.

Claim 4 of the 8,808,909 and instant claim 7 recite identically the same range of the graphene/nanotube weight ratio.

Claim 5 of the 8,808,909 and instant independent claim 10 recite same the range of weight percentage.

Claim 6 of the 8,808,909 and instant independent claim 11 recite same the range of the carbon nanotube dispersion scale.

Claim 7 of the 8,808,909 recites attachment which is broader than instant independent claims 1, 10, 11, and 12 which recite ionic attachment attachment.

Claim 8 of the 8,808,909 recites chemical attachment which is broader than instant independent claims 1, 10, 11, and 12 which recite ionic attachment attachment.

Claim 1 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1- of U.S. Patent No. 8,968,924. Although the claims at issue are not identical, they are not patentably distinct from each other because:

Claim 1 of 8,968,924 recites

> A composition used in lithium ion batteries comprising: discrete carbon nanotubes having ion active material attached to their surface, wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube, and wherein the ion active material comprise a lithium metal salt and an element selected from the group consisting of: iron, manganese, cobalt, copper, nickel, vanadium, titanium, and mixtures thereof.

This claim is broader in scope than instant independent claim 1 and 2 and identically recites the claimed ranges of the aspect ratio and oxidation levels of

the carbon nanotubes, the crystal/material layers, and the lithium metal salt elements.

Claim 2 of the 8,968,924 and instant claim 6 recite the same graphene or oxygenated graphene.

Claim 3 of the 8,968,924 and instant claim 7 recite identically the same range of the graphene/nanotube weight ratio.

Claim 4 of the 8,968,924 and instant independent claim 10 recite same the range of weight percentage and the lithium metal salt is obvious in the instant application based on instant claim 1.

Claim 5 of the 8,968,924 recites attachment which is broader than instant independent claim 1 which recites ionic attachment attachment.

Conclusion

The prior art **previously** made of record and not relied upon is considered pertinent to applicant's disclosure:

Maxim N. Tchoul,†, Warren T. Ford,*,†, Giulio Lolli,‡, Daniel E. Resasco,‡ and, and Sivaram Arepalli, *Effect of Mild Nitric Acid Oxidation on Dispersability, Size, and Structure of Single-Walled Carbon Nanotubes,* Chemistry of Materials 2007 19 (23), 5765-5772, teaches that the oxidation of single-walled carbon nanotubes (SWNTs) with nitric acid increases their dispersability in water, methanol, and N,N-dimethylformamide, see e.g. abstract.

Bo Jin, En Mei Jin, Kyung-Hee Park, Hal-Bon Gu, *Electrochemical properties of $LiFePO_4$-multiwalled carbon nanotubes composite cathode*

materials for lithium polymer battery, Electrochemistry Communications, Volume 10, Issue 10, October 2008, Pages 1537-1540, teaches a composite material relevant to the claimed invention.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip A. Stuckey, PhD whose telephone number is (571)272-9875. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on (571)272-1398. The fax

phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Philip A. Stuckey/
Examiner, Art Unit 1723

/NICHOLAS P D'ANIELLO/
Primary Examiner, Art Unit 1723

Applicant-Initiated Interview Summary	Application No.	Applicant(s)	
	13/529,797	BOSNYAK ET AL.	
	Examiner	Art Unit	
	Philip A. Stuckey, PhD	1723	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Philip A. Stuckey*.

(3) *Greg Porter*.

(2) *Nicholas D'Aniello*.

(4)_____.

Date of Interview: *12 May 2016*.

Type: ☐ Telephonic ☐ Video Conference
☒ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☐ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1 and 10-12*.

Identification of prior art discussed: *of record*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

*Greg Porter presented the issues noted in the attached agenda. The argument was made that the discrete, non-agglomerated, and exfoliated carbon nanotubes are not taught by Li 2006. The argument is ultimately not persuasive as Li 2006 is considered to teach the instant limitation as shown in Figure 2. The examiners commented that there is a lack of structural distinction within the claims as compared to the prior art*_____.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☒ Attachment

/Philip A. Stuckey/ Examiner, Art Unit 1723	

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

———

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13529797
Filing Date	2012-06-21
First Named Inventor	Clive P. Bosnyak
Art Unit	1723
Examiner Name	Phillip A. Stuckey
Attorney Docket Number	DENA-0008 (223156)

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.A.S/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Application Number	13529797
	Filing Date	2012-06-21
	First Named Inventor	Clive P. Bosnyak
	Art Unit	1723
	Examiner Name	Phillip A. Stuckey
	Attorney Docket Number	DENA-0008 (223156)

	1	Excerpts from NANOTECHNOLOGY FOR LITHIUM ION BATTERIES, Springer Science & Business Media, LLC, New York, (Abu-Lebdeh et al. eds. 2013)	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/PHILIP A STUCKEY/	Date Considered	08/05/2016

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.A.S/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Application Number	13529797
	Filing Date	2012-06-21
	First Named Inventor	Clive P. Bosnyak
	Art Unit	1723
	Examiner Name	Phillip A. Stuckey
	Attorney Docket Number	DENA-0008 (223156)

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Gregory L. Porter/	Date (YYYY-MM-DD)	2016-05-18
Name/Print	Gregory L. Porter	Registration Number	40131

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.A.S/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.A.S/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13529797
Filing Date	2012-06-21
First Named Inventor	Clive P. Bosnyak
Art Unit	1726
Examiner Name	Philip A. Stuckey
Attorney Docket Number	DENA-0008 (223156)

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6114068		2000-09-05	Yamada et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20050006623	A1	2005-01-13	Wong et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	103353475	CN	A	2013-10-16	Agamatrix, Inc.		
	2	100539288	CN	A	2009-01-09	Chara KK		
	3	101916851	CN	A	2010-12-15	Univ Shenzhen		

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.A.S/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Application Number	13529797
	Filing Date	2012-06-21
	First Named Inventor	Clive P. Bosnyak
	Art Unit	1726
	Examiner Name	Philip A. Stuckey
	Attorney Docket Number	DENA-0008 (223156)

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Office Action (CN Appl. No. 201280030167.1), dated August 5, 2015	

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EXAMINER SIGNATURE

Examiner Signature	/PHILIP A STUCKEY/	Date Considered	08/05/2016

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.A.S/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13529797
Filing Date	2012-06-21
First Named Inventor	Clive P. Bosnyak
Art Unit	1726
Examiner Name	Philip A. Stuckey
Attorney Docket Number	DENA-0008 (223156)

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Gregory L. Porter/	Date (YYYY-MM-DD)	2016-02-16
Name/Print	Gregory L. Porter	Registration Number	40131

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	("20050006623" | "6114068").PN.	US-PGPUB; USPAT	OR	ON	2016/08/05 12:39
L2	22036	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
L3	20071	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
L4	26323	L2 L3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
L5	14	L4 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6) and ("LiMnPO.sub.4" "Li.sub.3MnPO.sub.4")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
L6	1468	"LiMnPO.sub.4" and H01M$	US-PGPUB; USPAT	OR	ON	2016/08/05 15:51
L7	25	L6 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6) and ("LiMnPO.sub.4" "Li.sub.3MnPO.sub.4")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
L8	17	L7 not L5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/05 15:51
L9	29	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same (bond$4	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2016/08/05 15:51

		attach$4) same2 (active near3 material) not (ionic$6 adj liquid)	JPO; DERWENT; IBM_TDB			
S1	1	"20120328946".pn.	US-PGPUB; USPAT	OR	ON	2015/03/04 19:50
S2	18107	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S3	16328	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S4	12562	S2 and S3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S5	371	S4 and carbon near4 nanotube	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:56
S6	43	S5 and ratio with lithium with ion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:56
S7	7	("20110104551" | "20110311876" | "20110311876" | "20100159331").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 11:39
S8	3	("20110104551" | "20110311876" | "20110311876" | "20100159331").PN.	US-PGPUB; USPAT	OR	ON	2015/03/11 11:39
S9	18138	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S10	16364	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR;	OR	ON	2015/03/11 15:35

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S11	12592	S9 and S10	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S12	21	S11 and carbon near4 nanotube with (weight "wt" "wt%" "wt %")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S13	6	S12 and ratio with lithium with ion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:36
S14	9	S12 and carbon near4 nanotube with (weight "wt" "wt%" "wt %") and aspect near3 ratio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 20:43
S15	6	S12 and carbon near4 nanotube with (weight "wt" "wt%" "wt %") and aspect near3 ratio and graphene	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 20:43
S16	22	carbon near4 nanotube with oxidation near2 level	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:19
S17	5	S11 and S16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:19
S18	17	S16 not S17	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:20
S19	11	S11 and carbon near4 nanotube with	US-PGPUB;	OR	ON	2015/03/11

		function$7	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			21:22
S20	15	S11 and carbon near4 nanotube same function$7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:23
S21	4	S20 not S19	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:23
S22	464164	H01M$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:24
S23	632	S22 and carbon near4 nanotube with function$7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:24
S24	35	carbon near4 nanotube same oxidation near2 level	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:25
S25	18	S22 and S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:25
S26	5	S11 and S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:26
S30	1	"7070753".pn.	US-PGPUB; USPAT	OR	ON	2015/03/11 21:33
S31	5	S12 and carbon near4 nanotube with lithium near5 salt	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2015/03/11 22:35

			JPO; DERWENT; IBM_TDB			
S32	35	S22 and carbon near4 nanotube with lithium near5 salt	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:36
S33	6	S22 and carbon near4 nanotube with lithium near5 salt with weight	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:36
S34	29	S22 and carbon near4 nanotube same lithium near5 salt same (weight ratio)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:39
S35	5	S12 and carbon near4 nanotube same lithium near5 salt same (weight ratio)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:39
S40	5	("20110104551" | "7070753" | "20110311876" | "20110311876" | "20100176337" | "20100159331").PN.	US-PGPUB; USPAT	OR	ON	2016/01/21 18:06
S42	3	("8808909" "8968924" "9065132").PN.	US-PGPUB; USPAT	OR	ON	2016/01/22 08:21
S43	15	"25335609".FMID.	US-PGPUB; USPAT; FPRS	OR	ON	2016/01/28 16:59
S44	21649	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:12
S45	19710	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:12
S47	25934	S44 S45	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:12

S48	15	S47 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6) and ("LiMnPO.sub.4" "Li.sub.3MnPO.sub.4")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:43
S49	1280	"LiMnPO.sub.4" and H01M$	US-PGPUB; USPAT	OR	ON	2016/02/01 14:43
S50	24	S49 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6) and ("LiMnPO.sub.4" "Li.sub.3MnPO.sub.4")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:44
S51	15	S50 not S48	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:44
S54	29	S49 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) and ("LiMnPO.sub.4" lithium near4 manganese near4 phosphate)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:49
S55	25	S49 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same3 (active near3 material)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:52
S56	17	S47 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) and ("LiMnPO.sub.4" lithium near4 manganese near4 phosphate)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:52
S57	91	S47 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:54
S58	82	S47 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:55
S59	57	S47 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same	US-PGPUB; USPAT; USOCR;	OR	ON	2016/02/01 14:56

		(ionic$6 chemically) same (bond$4 attach$4) not (ionic$6 adj liquid)	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S60	117	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same (bond$4 attach$4) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 15:00
S61	26	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same (bond$4 attach$4) same2 (active near3 material) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 15:01
S62	61	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$4) same2 (active near3 material) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 15:07

EAST Search History (Interference)

<This search history is empty>

8/ 5/ 2016 3:53:22 PM
C:\ Users\ pstuckey\ Documents\ EAST\ Workspaces\ 13529797.wsp

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Fax Cover Sheet

From: Gregory Porter Employee No.: 10748

Sender's Direct Phone No.: +1.713.220.4621 Sender's Direct Fax No.: +1.713.238.7169

Date: May 10, 2016 Matter No.: 223156 No. of pages (including cover sheet): 3

RECIPIENT	COMPANY	FAX NUMBER	CONFIRMATION NUMBER
Examiner: Phillip A. Stuckey		571-273-9875	

Message

Please see the attached.

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DOCKET NO.
32493-223156

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:	Clive P. BOSNYAK	ART UNIT:	1723
SERIAL NO.:	13/529,797	EXAMINER:	PHILLIP A STUCKEY
CONFIRMATION NO.:	1004		
FILING DATE:	June 21, 2012		
FOR:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM		

PROPOSED INTERVIEW AGENDA

Applicant thanks Examiner Stuckey in advance for his participation in the personal Examiner Interview scheduled for Thursday, May 12, 2016 at 9:00 AM (Eastern) at the Remsen Building 400 Dulany St. Any data, arguments, or statements presented during the Examiner Interview are only provided to facilitate a meaningful discussion during the Examiner Interview. If you need to contact Applicant's attorney Gregory Porter in advance of the interview please call 713-449-9687.

Applicant's attorney expects to discuss the current independent claims, the technical differences between the Li 2006 reference and the claimed feature "wherein the discrete carbon nanotubes have crystals or layers of lithium ion active material ionically_attached to their surface" and the distinctions and technical differences in the claimed composition and Li Figure 2.

HOU:3684975.1

Applicant's attorney also expect to explain that independent Claim 1 is patentable over the references of record because a skilled artisan would understand that the steps disclosed in Li cannot yield the aforementioned limitation.

Respectfully submitted,

/Gregory L. Porter/

Gregory L. Porter
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PAGE 3/3 * RCVD AT 5/10/2016 9:55:21 AM [Eastern Daylight Time] * SVR:W-PTOFAX-001/45 * DNIS:2739875 * CSID: * DURATION (mm-ss):00-57

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13529797	BOSNYAK ET AL.
	Examiner	Art Unit
	Philip Stuckey	1723

CPC- SEARCHED		
Symbol	Date	Examiner
H01M 4/587	07/09/2014	EMC
H01M 4/525 4/505	11 March 2015, 2/1/16, 8/5/2016	PS

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
429	231.8	06/24/2014	EMC

SEARCH NOTES		
Search Notes	Date	Examiner
429 Consultation with Nicholas D'Aniello	06/24/2014	EMC
429 Consultation with Brian Talbot	07/09/2014	EMC
Inventor Search in PALM	06/24/2014	EMC
Assignee Search in EAST	06/24/2014	EMC
Application 14/128392 History and Search Reviewed	06/24/2014	EMC
EAST Keyword Search	06/24/2014	EMC
Inventor search in PALM	11 March 15, 2/1/16, 8/5/2016	PS
EAST search History Report	11 March 15, 2/1/16, 8/5/2016	PS
Consulted Milton Cano	11 March 15, 1/21/16	PS
NPL Google search: lithium ion battery solvent additives carbon nanotube LiFePO4	11 March 15	PS
Consulted Nick D'Aneillo	12 March 15, 8/4/2106	PS

/PHILIP A STUCKEY/ Examiner.Art Unit 1723	

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/PHILIP A STUCKEY/ Examiner.Art Unit 1723	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Clive P. Bosnyak, *et al.*
Serial No.:	13/529,797
Filed:	June 21, 2012
Art Unit:	1723
Examiner:	Phillip A. Stuckey
Conf. No.:	1004
For:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

Mail Stop Response
Commissioner for Patents
Box AF
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO OFFICE ACTION OF FEBRUARY 11, 2016, DECLARATIONS, AND INTERVIEW SUMMARY

Dear Examiner Stuckey:

Thank you for courtesies extended to myself and James Willson during the May 12th, 2016 personal interview to discuss the pending claims, the Li and Niu references, and potential evidence to overcome the rejection. While an agreement on the claims was not reached the interview was a productive exchange of views. As discussed, the instant response is being submitted with evidence via declarations from Dr. Finlayson and Dr. Henderson.

Listing of the Claims begin on page 2 of this paper.

Remarks begin on page 6 of this paper.

IN THE CLAIMS:

1. (Previously presented) A composition useful for lithium ion batteries comprising: discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active material ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

2. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise a lithium metal salt and an element selected from the group consisting of: iron, manganese, cobalt, copper, nickel, vanadium, titanium, and mixtures thereof.

3. (Previously presented) The composition of claim 2, wherein the lithium metal salt has an olivine crystal structure and wherein the lithium metal salt is $LiFePO_4$ or $LiMnPO_4$.

4. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise tin, silicon, copper, antimony, aluminum, germanium, titanium, or mixtures thereof.

5. (Cancelled).

6. (Original) The composition of claim 1, further comprising graphene or oxygenated graphene.

7. (Previously presented) The composition of claim 6, wherein the weight ratio of graphene to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

8. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

   a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level 1% to 15% percent by weight;

b) mixing the carbon nanotubes with a high boiling point liquid;

c) adding reagents in correct balance to synthesize a lithium salt;

d) reacting the mixture at a temperature to form the lithium salt while sonicating the mixture;

e) separating the solid discrete carbon nanotube salts from the liquid; and

f) drying and annealing the solid discrete carbon nanotube salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

9. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level of 1% to 15% by weight;

b) mixing the carbon nanotubes and a lithium salt in a liquid with surfactant;

c) sonicating the liquid carbon nanotube/lithium salt mixture;

d) separating the solid salts from the liquid; and

e) drying and annealing the solid discrete carbon nanotubes with attached lithium salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

10. (Previously presented) A composition useful for lithium ion batteries, comprising discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials ionically attached to their surface, and wherein the carbon nanotubes are in a weight ratio of carbon nanotubes to lithium salts of 0.1% to 10% and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

11. (Previously presented) A composition useful for lithium ion batteries, comprising oxidized discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials attached to their surface, and wherein the carbon nanotubes are uniformly dispersed without clustering on a dimension scale of less than about 1 micrometer and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

12. (Previously presented) A composition useful for lithium ion batteries, comprising uniformly dispersible oxidized , non-agglomerated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

13. (Original) The composition of claim 12, wherein the crystals or layers of lithium ion active materials are chemically attached to the surface of the dispersible oxidized carbon nanotubes.

14. (Previously presented) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

15. (Previously presented) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

16. (Previously presented) The composition of claim 10 where the ratio of lithium ion to other

total ions in the ion active materials is from 3:1 to 25:1.

17. (Previously presented) The composition of claim 10 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

18. (Previously presented) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

19. (Previously presented) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

20. (Previously presented) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

21. (Previously presented) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

REMARKS

Pending in the current application are Claims 1-7 and 10-21. Applicants respectfully request reconsideration of this Application in view of the following remarks and declarations submitted concurrently.[1]

I. Claims 1-7 and 10-21 Are Patentable Over the Cited Combination of References for Two Independent Reasons

The claims were rejected under 35 U.S.C. §103(a) (pre-AIA) as being unpatentable over Li 2006 (Li) in view of Niu et al. U.S. 7,070,753 (Niu). However, as described below there are two independent reasons that the suggested combination does not render the instant claims obvious. First, the suggested combination lacks crystals or layers of lithium ion active material ionically attached to the surface of nanotubes which is an express limitation of the claims. Second, the suggested combination lacks discrete, non-agglomerated, and exfoliated carbon nanotubes which is a second independent and express limitation of all the instant claims.

A. As Proven Via Dr. Finlayson's Declaration the Cited Combination Lacks Crystals or Layers of Lithium Ion Active Material Ionically Attached to the Surface of Nanotubes

The attached declaration from Dr. Malcolm Finlayson is definitive evidence that Li does not have carbon nanotubes with "crystals or layers of lithium ion active material ionically attached to their surface" as required by independent Claims 1, 10, 11, and 12. Reviewing the teachings of Li Dr. Finlayson concludes that "an ordinarily skilled person in the art would understand that Li's MWCNTs do not have any form of lithium ion active material (or anything else) ionically attached to their surface." (Finlayson Decl., para. 4).

As Dr. Finlayson points out it is axiomatic that for any ionic attachment to occur there "necessarily needs to be ions present". (Finlayson Decl., para. 5). However, it "is well-known and

[1] The prior Office Action stated that the claims may not have priority to provisional application 61/500,560. Applicants disagree but believe that there is no need to elaborate since the cited references at issue, Li and Niu, pre-date the provisional application filing date.

described in the literature" that "$LiFePO_4$ does not dissolve in the solvent employed in Li, i.e., N-methyl-2-pyrolidone (NMP). (Finlayson Decl., para. 5). Dr. Finlayson cites the specific literature reference of Nanotechnology for Lithium-Ion Batteries by Abu-Lebdeh et al. in support of his conclusion that Li "would not result in carbon nanotubes with "crystals or layers of lithium ion active material ionically attached to their surface" as required by independent Claims 1, 10, 11, and 12." (Finlayson Decl., para. 5).

The secondary reference of Niu does not remedy this deficiency as it does not relate to lithium ion active materials whatsoever.[2] Therefore, the claims cannot be rendered obvious because the suggested combination does not and cannot yield carbon nanotubes with "crystals or layers of lithium ion active material ionically attached to their surface" as required by independent Claims 1, 10, 11, and 12.

B. As Proven Via Dr. Henderson's Declaration the Cited Combination Lacks Discrete, Non-Agglomerated, and Exfoliated Carbon Nanotubes

The primary reference of Li does not teach or suggest the claimed "discrete, non-agglomerated, and exfoliated carbon nanotubes". This is confirmed as shown below by Li's own SEM images wherein one cannot ascertain two ends of even a single nanotube due to the agglomeration from entanglement of the nanotubes.

[2] The Office Action refers to MPEP section 2112.01 which relates to when the structure of a reference is substantially identical to that of the claims. However, that MPEP section is inapposite here wherein the claimed structure is substantially different from Li due to the claimed structure having ionic attachment.

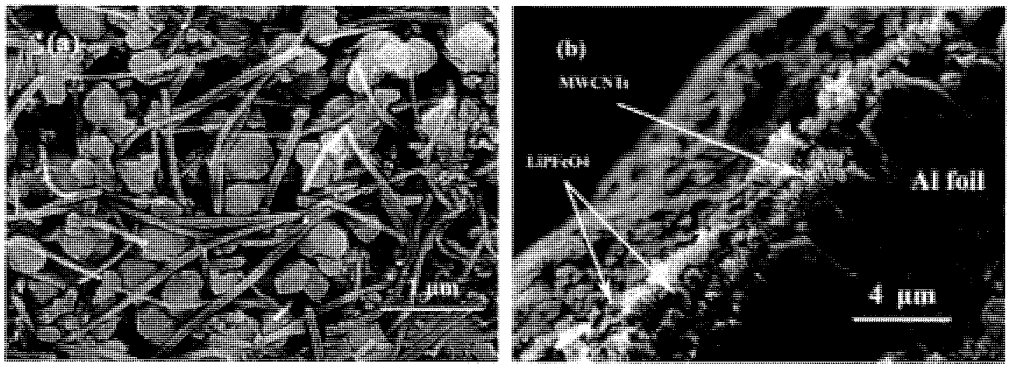


Fig. 2. SEM images of $LiFePO_4$/MWCNTs composite cathode (a: plane section; b: cross section).

The rejection therefore relies on Niu to remedy the deficiency of Li in this regard. However, Niu also does not employ the claimed "discrete, non-agglomerated, and exfoliated carbon nanotubes". This is confirmed in the language of Niu itself and in Dr. Henderson's evidentiary declaration submitted herewith.

Niu uses the word "discrete" in describing nanotubes at column 1, lines 10-15. (11/18/2015 Office Action at p.3). In doing so Niu states the nanotubes "are in the form of discrete nanotubes, or, in an aggregate form". (Niu, col. 1, line 14). Niu uses "discrete" in the context of (and in express reference to) "as produced" carbon nanotubes which, as discussed in the interview, are different from the claimed nanotubes. Niu makes this clear in in a number of places stating, for example:

> As produced carbon nanotubes may be in form of discrete nanotubes, aggregates of nanotubes or both. (col. 3, lines 3-5, emphasis added).
>
> It has been unexpectedly found that treatment of the as-produced carbon nanotubes or aggregates of carbon nanotubes with the oxidizing agents of the invention can change the hydrophobic surface properties of the as-produced carbon nanotubes to hydrophilic. (col. 16, lines 64-66, emphasis added).

"As produced" carbon nanotubes described in Niu are not discrete, non-agglomerated, or exfoliated. Dr. Henderson confirmed that one of ordinary skill in the art would understand that "Niu does not have discrete, non-agglomerated, and exfoliated oxidized carbon nanotubes as instantly

claimed. (Henderson Decl., para. 6). In fact, Dr. Henderson confirmed this by experimentally replicating two different examples of Niu including Example 10 relied upon at page 4 of the Office Action. (Henderson Decl., paras. 7-9). Dr. Henderson concluded that neither example produced "discrete, non-agglomerated, and exfoliated carbon nanotubes as seen through a scanning electron microscope." (Henderson Decl., paras. 8 and 9).

The suggested combination lacks "discrete, non-agglomerated, and exfoliated carbon nanotubes" as required by independent Claims 1, 10, 11, and 12. Therefore, the suggested combination lacks two express claim limitations and the claims cannot be rendered obvious.

II. Conclusion

It is submitted that the instant claims are patentable and a Notice of Allowance is requested. The Commissioner is hereby authorized to charge any required fees to our Andrews Kurth LLP Deposit Account No. 50-0897 (223156/DENA008). The Commissioner is also authorized to credit any fee overpayment to the aforementioned Deposit Account.

The Examiner is invited to call the undersigned attorney at 713-220-4621, if a telephone call could help resolve any item.

Respectfully submitted,

/Gregory L. Porter/

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Date: May 18, 2016

DOCKET NO. DENA-0008 (223156)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Clive P. Bosnyak
SERIAL NO.: 13/529,797
CONFIRMATION NO.: 1004
FILING DATE: 06/21/2012
ART UNIT: 1723
EXAMINER: Stuckey, Philip A

FOR: Lithium Ion Batteries Using Discrete Carbon Nanotubes, Methods for Production Thereof and Products Obtained Therefrom

DECLARATION OF DR. NANCY HENDERSON

Background and Qualifications

1. My name is Dr. Nancy Henderson. I am over the age of twenty-one (21), of sound mind, and fully competent to testify.

2. I am currently employed by Molecular Rebar Design LLC as Intellectual Property Manager. I received a Ph.D. in Mechanical Engineering in the year 1997 from the University of Texas Austin. I have expertise in carbon nanotubes based on my education, training, and work experience.

3. I have reviewed patent application Serial Number 13/529,797 and the reference of US Patent No. 7,070,753 to Niu *et al* (hereinafter "Niu") from the standpoint of an ordinarily skilled person in the art at the time of the instant invention and/or filing date. I have also previously replicated certain examples of Niu which further inform my statements below.

4. An ordinarily skilled person in the art would consider that Figure 1 below is an SEM micrograph representative of "as produced" carbon nanotubes that Niu refers to as "discrete".

Note that the tubes have the morphology of non-discrete, agglomerated, non-exfoliated nanotubes.

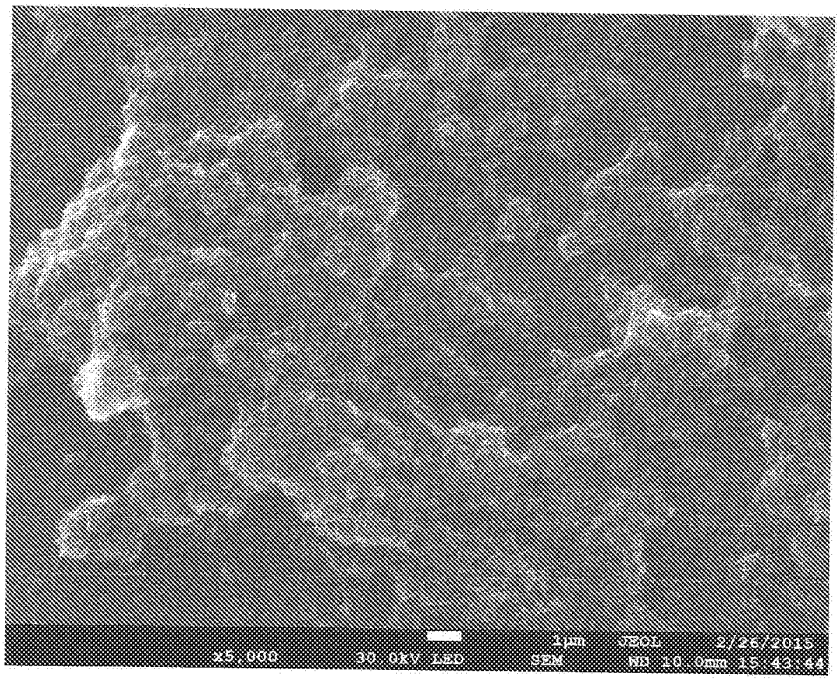


Figure 1 - conventional untreated carbon nanotubes (C9000).

5. Figure 2 below is a representative SEM micrograph of a plurality of discrete debundled, unentangled oxidized carbon nanotubes as described in Serial Number 13/529,797.

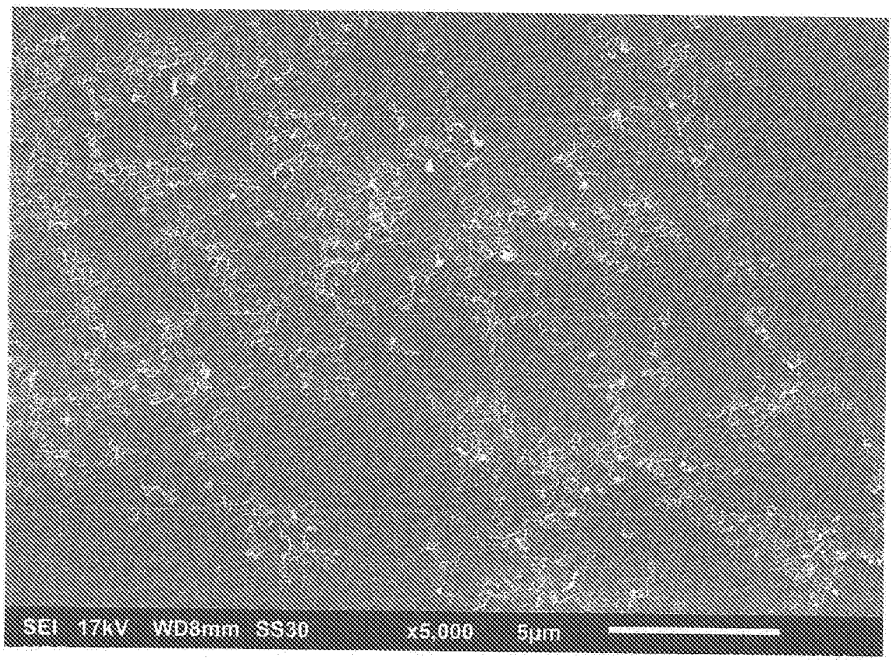


Fig 2 - plurality of discrete, non-agglomerated, and exfoliated oxidized carbon nanotubes described in Serial Number 13/529,797.

6. Therefore, Niu does not have discrete, non-agglomerated, and exfoliated oxidized carbon nanotubes as instantly claimed and as confirmed by the express language of Niu and by my experimental replication described below.

7. I ran experiments to determine if the examples in Niu produce discrete, non-agglomerated, and exfoliated carbon nanotubes.

8. Table 5 lists Example 10 of Niu as having carbon nanotubes that have an oxygen content of 3.8%. I confirm that the attached Experiment 1 describes the experiments relating to Example 10 of Niu in detail and includes true, accurate and factual experimental results that show Example 10 of Niu does not produce discrete, non-agglomerated, and exfoliated carbon nanotubes as seen through a scanning electron microscope.

9. I confirm that the attached Experiment 2 describes the experiments relating to Example 23 of Niu in detail and includes true, accurate and factual experimental results that show Example 23 of the '753 Patent does not produce discrete, non-agglomerated, and exfoliated carbon nanotubes as seen through a scanning electron microscope.

10. I declare under penalty of perjury under the laws of the United States of America that the foregoing statements are true and correct. I further hereby declare that all statements made herein of my own knowledge are true and correct and that any other statements or opinions made herein are believed to be true and correct based on the information that I have received to date.

EXECUTED on this 16 day of May 2016.

Dr. Nancy Henderson Nancy Henderson

EXPERIMENT 1

1. *PURPOSE*

Analysis of the carbon nanotubes as prepared by the method of Example 10 of U.S. Patent No. 7,070,753 ("Example 10 of Niu or the '753 Patent") and its comparison to the carbon nanotubes in U.S. Patent Application Serial No. 13/529,797.

2. *PROCEDURE*

The procedures as outlined in Example 10 of the '753 Patent were followed but the quantities were proportionally scaled down to accommodate the available equipment. Details of the experiment as performed by Nancy Henderson were recorded in data book SN 2014-05-0001, pages 51-52.

A round bottom flask was placed in a water bath on a thermocouple controlled stirring hot plate. A stirrer bar was placed in the water bath and in the flask to insure uniform temperature and reaction agitation. A condenser with room temperature cooling water was attached to the flask to reduce evaporation. A thermocouple linked to the hot plate was inserted into one neck of the flask (Figure 1). To the flask, 30 grams of 30% aqueous solution of hydrogen peroxide, (Semiconductor Grade, UltraPure Solutions) were added. To this, 2.13 grams cotton candy ("CC") type carbon nanotubes ("CNT") (Flowtube 9000, CNano Technology) were slowly added. An additional 10 grams of hydrogen peroxide were added to wash down any carbon nanotubes clinging to the side of the flask. The total amount of hydrogen peroxide used was 40 grams. The starting temperature was 23.1 °C. The water bath was used to control the temperature of the reaction so that the temperature of the reaction was kept between 80 and 90 °C. The first sign of the reaction, indicated by bubbling, was detected within 5 minutes of addition of the carbon nanotubes. The reaction proceeded until the hydrogen peroxide was depleted as confirmed by a peroxide stick test. The time of reaction was two hours as measured from the first signs of reaction.

After 2 hours, the solution was cooled to room temperature. It was filtered and then washed with 5 volumes of reversed osmosis ("RO") water. The CNT were dried in a vacuum oven overnight.

Samples for scanning electron microscope ("SEM") were prepared by adding a small quantity of dried carbon nanotubes to isopropyl alcohol and sonicated for 15 seconds in a

sonicating water bath. A drop was placed on a silicon wafer which was then attached to a SEM stube with graphite glue. Imaging was performed by Nancy Henderson using a Jeol JSM-6010LA scanning electron microscope. There treated tubes (Figure 3) were imaged and found to retain the CC appearance of the untreated tubes (Left Image of Figure 3). It appears that the procedure did not alter the morphology of the CNT and they remained entangled (Right Image of Figure 3). Even at high magnification, the treated tubes retained the CC appearance.

The discrete carbon nanotubes of the type used in the leads paste of the instant Patent Application were prepared from the same CC CNT source (Flowtube 9000, CNano Technology). The carbon nanotubes were sonicated in a concentrated 65.5% nitric acid solution for a target of 20 kJ/g energy input at 75 °C for 5 hours. When compared to the CNT treated according to Example 10 of the '753 Patent, the distinction between discrete, non-agglomerated, and exfoliated and the '753 Patent is clearly seen (Figure 4).

3. CONCLUSION

The process as described in Example 10 of the '753 Patent, did not produce discrete non-agglomerated, and exfoliated carbon nanotube tubes as seen through a scanning electron microscope.

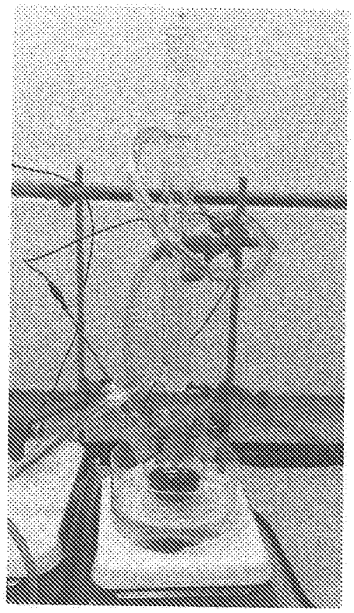


Figure 1
Experimental Setup

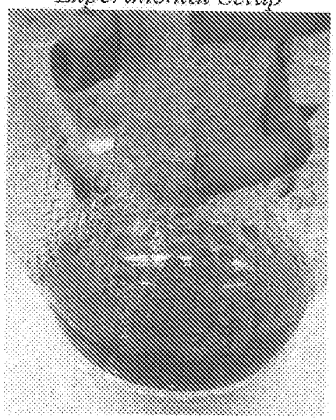


Figure 2
Signs or Reaction



Figure 3
Left Image: Untreated CNT (Magnification 1000x)
Right Image: Treated CNT (Magnification 1000x)

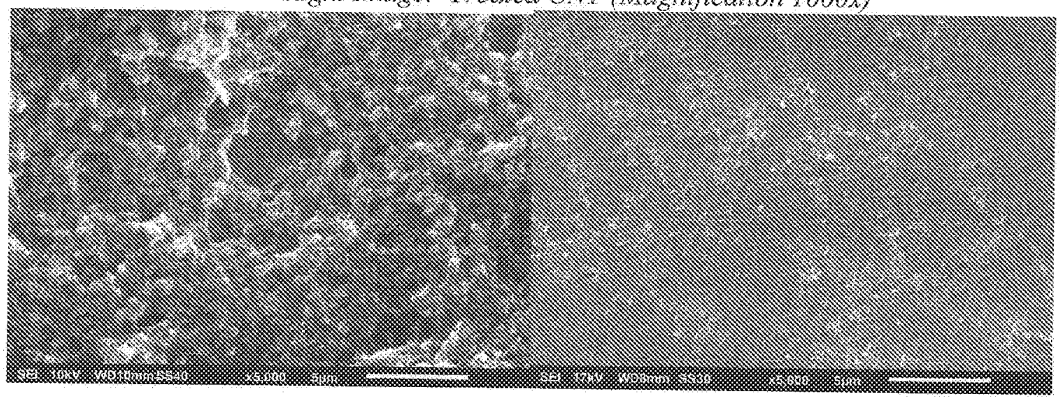


Figure 4
Left Image: CNT Treated per Example 10 of the '753 Patent (Magnification 5000x)
Right Image: Discrete CNT used in application (Magnification 5000x)

EXPERIMENT 2

PURPOSE

Analysis of the carbon nanotubes as prepared by the method of Example 23 of U.S. Patent No. 7,070,753 ("Example 23 of the '753 Patent") and its comparison to the carbon nanotubes of U. S. Patent Application Serial No. 13/529,797.

PROCEDURE

The procedures as outlined in Example 23 of the '753 Patent, were followed but the quantities were proportionally scaled down to accommodate the available equipment. Details of the experiment as performed by Nancy Henderson were recorded in data book SN 2014-05-0001, pages 49-50.

A round bottom flask was placed in a water bath on a thermocouple-controlled stirring hot plate. A stirrer bar was placed in the water bath and in the flask to insure uniform temperature and reaction agitation. A condenser sealed with a septum and vented via a small bore needle was attached to the flask to reduce evaporation. A thermocouple linked to the hot plate was inserted into one neck of the flask (Figure *1*). To the flask, 30 grams of acetone (Semiconductor Grade, UltraPure Solutions) were added. 18.3 grams of cumene hydroperoxide (Sigma Aldrich) were slowly added while stirring. Once addition was complete, 0.36 grams of cotton candy ("CC") type carbon nanotubes ("CNT") (Flowtube 9000, CNano Technology) were slowly added. Bath was at 37 °C at the start. Temperature was monitored over a 2 hour period and held between 35° C and 40 °C (average = 37.5 °C). No appreciable loss of solvent was observed.

After 2 hours, the solution was cooled to room temperature. It was filtered and then washed with 5 volumes of reversed osmosis ("RO") water. The CNT were dried in a vacuum oven overnight.

Samples for scanning electron microscope ("SEM") were prepared by adding a small quantity of dried tubes to isopropyl alcohol and sonicated for 15 seconds in a sonicating water bath. A drop was placed on a silicon wafer which was then attached to a SEM stub with graphite glue. Imaging was performed by Nancy Henderson using a Jeol JSM-6010LA scanning electron microscope. The treated tubes (Figure 2) were imaged and found to retain the CC appearance of

the untreated tubes (Figure 3). It appears that the procedures did not alter the morphology of the CNT and the CNT remained entangled.

The discrete carbon nanotubes of the type used in the instant 'application were prepared from the same CC CNT source (Flowtube 9000, CNano Technology). The carbon nanotubes were sonicated in a concentrated 65.5% nitric acid solution for a target of 20 kJ/g energy input at 75 °C for 5 hours. When compared to the CNT treated per Example 23 of the '753 Patent, the distinction between discrete, non-agglomerated, and exfoliated carbon nanotubes and the '753 Patent is clearly seen (Figure 3).

CONCLUSION

The process as described in Example 23 of the '753 Patent did not produce non-agglomerated, and exfoliated carbon nanotubes as seen through a scanning electron microscope.

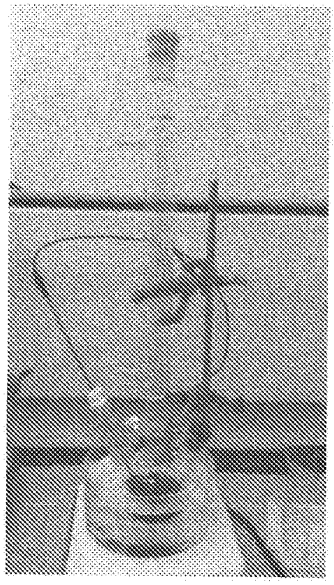


Figure 1
Experimental Setup

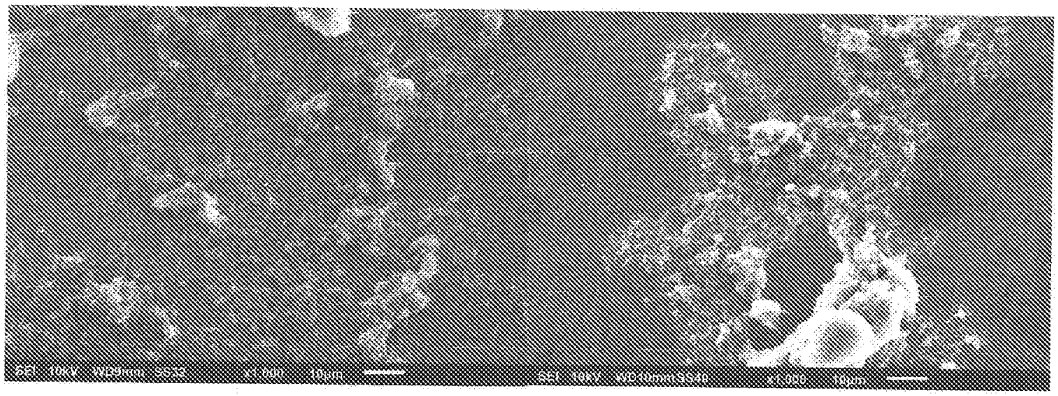


Figure 2
Left Image: Untreated CNT
Right Image: Treated CNT per Example 23 of the '753 Patent (Magnification 1000x)

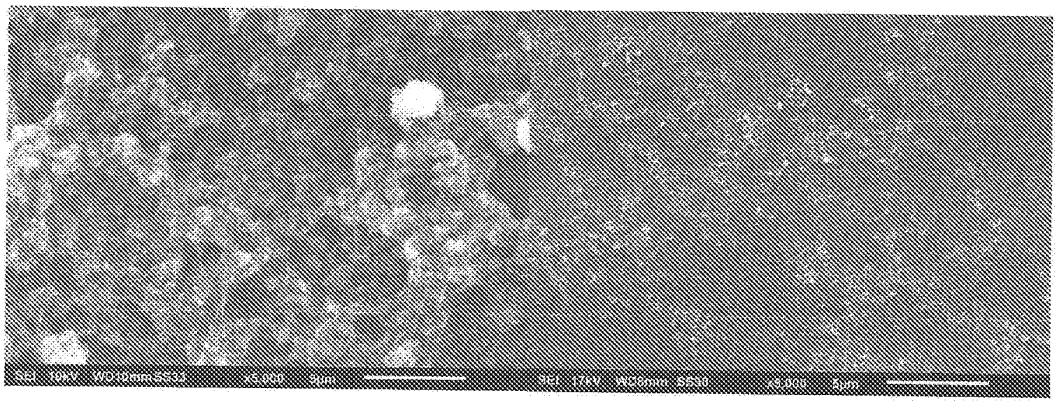


Figure 3
Left Image: CNT treated per Example 23 of the '753 Patent
Right Image: Discrete CNT used in lead paste (Magnification 5000x)

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	13529797
	Filing Date	2012-06-21
	First Named Inventor	Clive P. Bosnyak
	Art Unit	1723
	Examiner Name	Phillip A. Stuckey
	Attorney Docket Number	DENA-0008 (223156)

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	First Named Inventor	Clive P. Bosnyak
	Art Unit	1723
	Examiner Name	Phillip A. Stuckey
	Attorney Docket Number	DENA-0008 (223156)

	1	Excerpts from NANOTECHNOLOGY FOR LITHIUM ION BATTERIES, Springer Science & Business Media, LLC, New York, (Abu-Lebdeh et al. eds. 2013)	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Filing Date	2012-06-21
	First Named Inventor	Clive P. Bosnyak
	Art Unit	1723
	Examiner Name	Phillip A. Stuckey
	Attorney Docket Number	DENA-0008 (223156)

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Gregory L. Porter/	Date (YYYY-MM-DD)	2016-05-18
Name/Print	Gregory L. Porter	Registration Number	40131

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

DOCKET NO. DENA-0008 (223156)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Clive P. Bosnyak
SERIAL NO.: 13/529,797
CONFIRMATION NO.: 1004
FILING DATE: 06/21/2012
ART UNIT: 1723
EXAMINER: Stuckey, Philip A

FOR: Lithium Ion Batteries Using Discrete Carbon Nanotubes, Methods for Production Thereof and Products Obtained Therefrom

DECLARATION OF DR. MALCOLM FINLAYSON

Background and Qualifications

1. My name is Dr. Malcolm Finlayson. I am over the age of twenty-one (21), of sound mind, and fully competent to testify.

2. I am currently employed by Molecular Rebar Design LLC as a senior scientist. I received a Ph.D. in chemistry in the year 1983 from University of California, Santa Barbara. I have expertise in carbon nanotubes based on my education, training, and work experience.

3. I have reviewed patent application Serial Number 13/529,797 and the reference of Li et al., A novel network composite cathode of LiFePO4 / multiwalled carbon nanotubes with high rate capability for lithium ion batteries, Electrochemistry Communications 9 (2007) 663-666 (hereinafter "Li") from the standpoint of an ordinarily skilled person in the art at the time of the instant invention and/or filing date.

4. Li describes a "novel preparation of $LiFePO_4$ / MWCNT composite cathode" (Li, p.663 last sentence). Li describes that "[t]he cathode slurry was prepared by mixing $LiFePO_4$, polyvinylidine difluoride (PVDF) and acetylene black or MWCNTs in the weight ratio of 90:5:5

in N-methyl-2-pyrolidone (NMP) solvent." (Li, p.664 2nd column, 2nd paragraph). Based on this description and the other teachings of Li an ordinarily skilled person in the art would understand that Li's MWCNTs do not have any form of lithium ion active material (or anything else) ionically attached to their surface.

5. An ordinarily skilled artisan understands that for ionic attachment to occur there necessarily needs to be ions present. $LiFePO_4$ does not dissolve in the solvent employed in Li, i.e., N-methyl-2-pyrolidone (NMP). This is well-known and described in the literature. See, for example, the attached excerpt from p. 204 of Nanotechnology for Lithium-Ion Batteries by Abu-Lebdeh et al. stating, "we can conclude that the $LiFePO_4$ does not react with this product [NMP]." The excerpt expressly recognizes that there could be a negligible amount of Fe and P ions. However, the ordinarily skilled artisan would recognize that the negligible amount of Fe and P ions would not result in lithium ion active material ionically attached to a nanotube surface and certainly would not result in carbon nanotubes with "crystals or layers of lithium ion active material ionically attached to their surface" as required by independent Claims 1, 10, 11, and 12.

6. I declare under penalty of perjury under the laws of the United States of America that the foregoing statements are true and correct. I further hereby declare that all statements made herein of my own knowledge are true and correct and that any other statements or opinions made herein are believed to be true and correct based on the information that I have received to date.

EXECUTED on this 18th day of May 2016.

M. Finlayson

Dr. Malcolm Finlayson

Electronic Patent Application Fee Transmittal	
Application Number:	13529797
Filing Date:	21-Jun-2012
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Filer:	Gregory L. Porter/Jeanne Dunn
Attorney Docket Number:	DENA-0008 (223156)
Filed as Small Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 1 month with $0 paid	2251	1	100	100
Miscellaneous:				
Submission- Information Disclosure Stmt	2806	1	90	90
		Total in USD ($)		**190**

Electronic Acknowledgement Receipt	
EFS ID:	25818949
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	18-MAY-2016
Filing Date:	21-JUN-2012
Time Stamp:	17:49:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$190
RAM confirmation Number	4673
Deposit Account	500897
Authorized User	PORTER, GREGORY L.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		ROA_02112016.pdf	124793 d1b17bcc79ad410f3ed7bf19d440a647eefa7902	yes	9
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment Copy Claims/Response to Suggested Claims		1	5	
	Applicant Arguments/Remarks Made in an Amendment		6	9	
Warnings:					
Information:					
2	Affidavit-traversing rejectns or objectns rule 132	HendersonDeclaration_Niu.PDF	7471336 d5e2f276c14f700046f71ead996baf0468d59fdf	no	12
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	SuppIDS_05182016.pdf	528015 13bc56920fb1243d0b52ae30744b0797afcd3bd6	no	4
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
4	Non Patent Literature	Nanotechnology.pdf	1086815 50692c452083736b45bec5a1f226136f15ec1407	no	7
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
5	Affidavit-traversing rejectns or objectns rule 132	FinlaysonDeclaration.pdf	103065 dad97b5cbd509a4707489d4195cc178e2084ba67	no	3
Warnings:					
Information:					

6	Fee Worksheet (SB06)	fee-info.pdf	32974 0bbf7a4e2f614d05137484caa5dbe1042277055f	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	9346998	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/529,797	Filing Date 06/21/2012	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 05/18/2016

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 20	Minus	** 21	= 0	X $40 =	0
Independent (37 CFR 1.16(h))	* 6	Minus	***6	= 0	X $210 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/SHEILA D. CHAPMAN/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13529797
Filing Date	2012-06-21
First Named Inventor	Clive P. Bosnyak
Art Unit	1726
Examiner Name	Philip A. Stuckey
Attorney Docket Number	DENA-0008 (223156)

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6114068		2000-09-05	Yamada et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20050006623	A1	2005-01-13	Wong et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	103353475	CN	A	2013-10-16	Agamatrix, Inc.		
	2	100539288	CN	A	2009-01-09	Chara KK		
	3	101916851	CN	A	2010-12-15	Univ Shenzhen		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13529797
	Filing Date	2012-06-21
	First Named Inventor	Clive P. Bosnyak
	Art Unit	1726
	Examiner Name	Philip A. Stuckey
	Attorney Docket Number	DENA-0008 (223156)

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Office Action (CN Appl. No. 201280030167.1), dated August 5, 2015	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13529797
	Filing Date	2012-06-21
	First Named Inventor	Clive P. Bosnyak
	Art Unit	1726
	Examiner Name	Philip A. Stuckey
	Attorney Docket Number	DENA-0008 (223156)

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Gregory L. Porter/	Date (YYYY-MM-DD)	2016-02-16
Name/Print	Gregory L. Porter	Registration Number	40131

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal					
Application Number:	13529797				
Filing Date:	21-Jun-2012				
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM				
First Named Inventor/Applicant Name:	Clive P. Bosnyak				
Filer:	Gregory L. Porter/Jeanne Dunn				
Attorney Docket Number:	DENA-0008 (223156)				
Filed as Small Entity					
Filing Fees for Utility under 35 USC 111(a)					
Description		**Fee Code**	**Quantity**	**Amount**	**Sub-Total in USD($)**
Basic Filing:					
Pages:					
Claims:					
Miscellaneous-Filing:					
Petition:					
Patent-Appeals-and-Interference:					
Post-Allowance-and-Post-Issuance:					
Extension-of-Time:					

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	2806	1	90	90
		Total in USD ($)		**90**

Electronic Acknowledgement Receipt	
EFS ID:	24923975
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	16-FEB-2016
Filing Date:	21-JUN-2012
Time Stamp:	15:39:04
Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	Supp_IDS.pdf	528144 5186f3ad4b69445bff22d6b5bb8ff29f1e8fc08d	no	4
Warnings:					
Information:					
2	Foreign Reference	CN_103353475.pdf	1413747 ebb9cb14554c950d2fdcd444d5a4c569a4ca8a54	no	45
Warnings:					
Information:					
3	Foreign Reference	CN_101916851.pdf	526347 c4ae0b9daae0e462ba7b2c1de32a3bdd1078bb0a	no	19
Warnings:					
Information:					
4	Foreign Reference	CN_101103485.pdf	1341099 988898b1bcd06edca151095cbf94209c949ded1a	no	50
Warnings:					
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5	Non Patent Literature	CN_OA_08152015.pdf	347934 b011f47ba605a96954fe6409879f034de480b340	no	7
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	30856 fd3986aed2f8ef726b9fc66bfd3aea5fad8e6064	no	2
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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 02/11/2016

Andrews Kurth LLP
600 Travis Street
Suite 4200
Houston, TX 77002

EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
02/11/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patenttrademarks@andrewskurth.com

Office Action Summary	Application No. 13/529,797	Applicant(s) BOSNYAK ET AL.	
	Examiner Philip A. Stuckey, PhD	Art Unit 1723	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/6/15*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-4 and 6-21* is/are pending in the application.

5a) Of the above claim(s) *8 and 9* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-4,6,7 and 10-21* is/are rejected.

8)☒ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

The present application is being examined under the pre-AIA first to invent provisions.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/06/2015 has been entered.

Claims 1-4 and 6-21 are pending; claims 8-9 are withdrawn.

The objections to the specification and the claims of the last Office action are withdrawn.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Priority

As noted previously, the examiner does not find support for the instant claim amendments in provisional application 61/500,560 and accordingly, the claims are not entitled to the benefit date of the provisional application but rather toward the filing date of the instant application on 21 June 2012.

Claim Rejections - 35 USC § 103

Claims 1-4 and 10-21 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Li et al., *A novel network composite cathode of LiFePO4/multiwalled carbon nanotubes with high rate capability for lithium ion batteries*, Electrochemistry Communications, Volume 9, Issue 4, April 2007, Pages 663-666, herein referred to as "Li 2006" in view of Niu et al., US 7,070,753 B2, herein referred to as Niu '753.

As to **claim 1**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, see e.g. Section 4. Conclusions. Li 2006 further teaches discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface (MWCNTs with surfaces, see figure 2, which are considered discrete and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials with e.g. lithium migratable ions which are considered layered as instantly claimed, see page 664

second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 is a point which falls within the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1 and thus anticipates the claimed range. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2.

Li 2006 does not teach the oxidized species, aspect ratio, and oxidation level of the carbon nanotubes.

Niu '753 teaches disassembled (disentangled) discrete carbon nanotubes that have an oxygen content of 3.8% (column 6, lines 41-44, Table 5), which is considered the oxidation level. Niu '753 further teaches nanotubes include those having a length to diameter ratio of greater than 5 (column 8, lines 34-40). This teaching of Niu teaches an aspect ratio of 5 or greater which establishes a prima facie case of obviousness as it encompasses the claimed range. See MPEP 2144.05 regarding the Obviousness of Ranges. Niu '753 further teaches the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone or hydroxyl functionalities (see col 10 lines 4-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use disassembled discrete carbon nanotubes with carboxylic, ketone or hydroxyl functionalities and increased oxygen content in the invention of Li

2006 because Niu discloses that an increase in oxygen content can also improve density of the material (column 14, lines 66-67). It also would have been obvious to one of ordinary skill in the art at the time of the invention to use the aspect ratio as taught by Niu for the carbon nanotubes of Li 2006 because one would want a sufficient aspect ratio for binding to the materials in the electrode. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Regarding the ionically attached surface of the discrete carbon nanotubes having layers of lithium ion active material ionically attached to their surface, the prior art teaches the structure and materials of the composition as instantly claimed and it is therefore expected that the same ionic attachment is present in the prior art.

See MPEP Section 2112.01 I. PRODUCT AND APPARATUS CLAIMS - WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the

prior art are the same, **the applicant has the burden of showing that they are not.**" In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

As to **claims 2 and 3**, Li 2006 teaches $LiFePO_4$ which is a lithium metal salt having and element selected from the group consisting of iron, having an olivine crystal structure, and the lithium metal salt is $LiFePO_4$.

As to **claim 4**, Li 2006 teaches the loading of the $LiFePO_4$ on Al foil (see page 664 second column second paragraph) which teaches the layers of lithium ion active material comprise aluminum as instantly claimed.

As to **claim 10**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, See e.g. Section 4. Conclusions. Li 2006 further teaches discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface (MWCNTs with surface, see figure 2, which are considered discrete, non-agglomerated, and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials which is considered a layer as instantly claimed with e.g. lithium migratable ions, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 teaches the claimed range of a ratio of

lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2.

Li 2006 teaches the cell contains 1 molar $LiPF_6$, which is a lithium salt, in the electrolyte (see page 664 second column second paragraph) which penetrates the positive electrode to provide an ionic pathway within the electrochemical cell. Li 2006 further teaches that the ratio of the carbon nanotubes in the cathode is in a weight ratio of 5% to the total cathode slurry weight and that the cathode is dissolved in NMP solvent (see page 664 second column second paragraph). It is readily seen from this teaching that the weight ratio of carbon nanotubes is low in comparison to the total weight of the cathode active material.

Li 2006 does not teach the weight ratio of the carbon nanotubes to the the weight ratio of the lithium salts, but rather Li 2006 teaches the concentration of lithium salts to carbon nanotubes and that this ratio is relatively low in comparison; thus this teaching of Li 2006 establishes a prima facie case of obviousness regarding the claimed ranges for a weight ratio of carbon nanotubes to lithium salts of 0.1% to 10%. See MPEP 2144.05 regarding the Obviousness of Ranges. It is well known that one desires a low solution resistance to prevent losses. Furthermore, one of ordinary skill in the art would be able to determine through routine experimentation the optimal weight ratio of carbon nanotubes to lithium salts and could arrive at 0.1% to 10% to decrease the solution resistance of a lithium ion battery. Furthermore, it has been held that where the

general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Li 2006 does not teach the oxidized species, aspect ratio, and oxidation level of the carbon nanotubes.

Niu '753 teaches disassembled (disentangled) discrete carbon nanotubes that have an oxygen content of 3.8% (column 6, lines 41-44, Table 5), which is considered the oxidation level. Niu '753 further teaches nanotubes include those having a length to diameter ratio of greater than 5 (column 8, lines 34-40). This teaching of Niu teaches an aspect ratio of 5 or greater which establishes a prima facie case of obviousness as it encompasses the claimed range. See MPEP 2144.05 regarding the Obviousness of Ranges. Niu '753 further teaches the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone or hydroxyl functionalities (see col 10 lines 4-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use disassembled discrete carbon nanotubes with carboxylic, ketone or hydroxyl functionalities and increased oxygen content in the invention of Li 2006 because Niu discloses that an increase in oxygen content can also improve density of the material (column 14, lines 66-67). It also would have been obvious to one of ordinary skill in the art at the time of the invention to use the aspect ratio as taught by Niu for the carbon nanotubes of Li 2006 because one would want a sufficient aspect ratio for binding to the materials in the electrode. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering

the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Regarding the ionically attached surface of the discrete carbon nanotubes having layers of lithium ion active material ionically attached to their surface, the prior art teaches the structure and materials of the composition as instantly claimed and it is therefore expected that the same ionic attachment is present in the prior art.

See MPEP Section 2112.01 I. PRODUCT AND APPARATUS CLAIMS - WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, **the applicant has the burden of showing that they are not.**" In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

As to **claim 11**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, See e.g. Section 4. Conclusions. Li 2006 further teaches discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface (MWCNTs with surface, see figure 2,

which are considered discrete and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials with e.g. lithium migratable ions, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 is a point which falls within the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1 and thus anticipates the claimed range. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface and wherein the carbon nanotubes are uniformly dispersed without clustering on a dimension scale of less than about 1 micrometer, see figures 2a and 2b which shows the MWCNTs on a dimension scale of 1 micron in 2a being uniformly dispersed without clustering.

Li 2006 does not teach the oxidized species, aspect ratio, and oxidation level of the carbon nanotubes.

Niu ‘753 teaches disassembled (disentangled) discrete carbon nanotubes that have an oxygen content of 3.8% (column 6, lines 41-44, Table 5), which is considered the oxidation level. Niu ‘753 further teaches nanotubes include those having a length to diameter ratio of greater than 5 (column 8, lines 34-40). This teaching of Niu teaches an aspect ratio of 5 or greater which establishes a prima facie case of obviousness as it

encompasses the claimed range. See MPEP 2144.05 regarding the Obviousness of Ranges. Niu '753 further teaches the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone or hydroxyl functionalities (see col 10 lines 4-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use disassembled discrete carbon nanotubes with carboxylic, ketone or hydroxyl functionalities and increased oxygen content in the invention of Li 2006 because Niu discloses that an increase in oxygen content can also improve density of the material (column 14, lines 66-67). It also would have been obvious to one of ordinary skill in the art at the time of the invention to use the aspect ratio as taught by Niu for the carbon nanotubes of Li 2006 because one would want a sufficient aspect ratio for binding to the materials in the electrode. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

As to **claim 12**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, See e.g. Section 4. Conclusions. Li 2006 further teaches oxidized, non-agglomerated, carbon nanotubes having a surface (MWCNTs with surface, see figure 2 and the first paragraph of the Experimental section on page 664), which are considered oxidized because they are washed with nitric acid).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials with e.g. lithium migratable ions, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 is an anticipatory point which falls within the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2.

Li 2006 does not teach the oxidized species, aspect ratio, and oxidation level of the carbon nanotubes.

Niu '753 teaches disassembled (disentangled) discrete carbon nanotubes that have an oxygen content of 3.8% (column 6, lines 41-44, Table 5), which is considered the oxidation level. Niu '753 further teaches nanotubes include those having a length to diameter ratio of greater than 5 (column 8, lines 34-40). This teaching of Niu teaches an aspect ratio of 5 or greater which establishes a prima facie case of obviousness as it encompasses the claimed range. See MPEP 2144.05 regarding the Obviousness of Ranges. Niu '753 further teaches the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone or hydroxyl functionalities (see col 10 lines 4-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use disassembled discrete carbon nanotubes with carboxylic, ketone or hydroxyl functionalities and increased oxygen content in the invention of Li 2006 because Niu discloses that an increase in oxygen content can also improve density of the material (column 14, lines 66-67). It also would have been obvious to one of ordinary skill in the art at the time of the invention to use the aspect ratio as taught by Niu for the carbon nanotubes of Li 2006 because one would want a sufficient aspect ratio for binding to the materials in the electrode. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Regarding the ionically attached surface of the discrete carbon nanotubes having layers of lithium ion active material ionically attached to their surface, the prior art teaches the structure and materials of the composition as instantly claimed and it is therefore expected that the same ionic attachment is present in the prior art.

See MPEP Section 2112.01 I. PRODUCT AND APPARATUS CLAIMS - WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been

established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, **the applicant has the burden of showing that they are not.**" In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

As to **claim 13**, Li 2006 teaches the discrete carbon nanotubes having layers of lithium ion active material are attached to their surface, see figure 2.

Li 2006 teaches the product as instantly claimed. The limitation regarding chemical attachment does not impart additional structural or chemical limitations that distinguish the instant claims from that of the prior art.

Furthermore, it is inherent that Van der Waals forces exist between the materials of Li 2006 which teaches chemical attachment as instantly claimed.

As to **claims 14 and 15**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1 which anticipates the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

As to **claims 16 and 17**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1 which teaches the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

As to **claims 18 and 19**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of

18:1 which anticipates the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

As to **claims 20 and 21**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1 which anticipates the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

Claims 6 and 7 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Li 2006 in view of Niu '753 and in further view of Zhamu et al., US 2010/0176337 A1, herein referred to as Zhamu '337.

As to **claims 6 and 7**, Li 2006 teaches the composition of claim 1.

Li 2006 does not teach the composition further comprising graphene or oxygenated graphene and wherein the weight ratio of grapheme to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

Zhamu '337 teaches graphene reinforced composite electrode for lithium ion batteries (see e.g. title and abstract). Zhamu '337 further teaches that the graphene platelets occupy a weight fraction of 2% to 50% of the total nanocomposite weight (see [0089]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the graphene weight fraction as taught by Zhamu '337 in the the nanocomposite mixture of Li 2006 because Zhamu '337 teaches that the graphene reinforces the electrode.

Double Patenting

Applicant is advised that should claims 1, 10, 11, or 12 be found allowable, the other of claims 1, 10, 11, and 12 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

The differences in the discrete, dispersible, etc. descriptions used to describe the carbon nanotubes do not recite a clear distinction as presently claimed. Furthermore, claim 10 differs in the weight ratio of carbon nanotubes to lithium salts which would be an obvious variant based upon Li 2006's teaching regarding the concentration of lithium salts to carbon nanotubes as discussed with claim 10 above.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d

1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/forms/. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claim 1 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1- of U.S. Patent No. 8,808,909. Although the claims at issue are not identical, they are not patentably distinct from each other because:

Claim 1 of the 8,808,909 recites

> A composition useful for lithium ion batteries comprising: discrete carbon nanotubes having crystals or layers of lithium ion active material attached to their surface, wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

This claim is broader in scope than instant independent claims 1, 10, 11, and 12 and identically recites the claimed ranges of the aspect ratio and oxidation levels of the carbon nanotubes as well as claiming the crystal/material layers.

Claim 2 of the 8,808,909 and instant claim 4 recite the same group elements for the crystals/layers.

Claim 4 of the 8,808,909 and instant claim 7 recite identically the same range of the graphene/nanotube weight ratio.

Claim 5 of the 8,808,909 and instant independent claim 10 recite same the range of weight percentage.

Claim 6 of the 8,808,909 and instant independent claim 11 recite same the range of the carbon nanotube dispersion scale.

Claim 7 of the 8,808,909 recites attachment which is broader than instant independent claims 1, 10, 11, and 12 which recite ionic attachment attachment.

Claim 8 of the 8,808,909 recites chemical attachment which is broader than instant independent claims 1, 10, 11, and 12 which recite ionic attachment attachment.

Claim 1 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1- of U.S. Patent No. 8,968,924. Although the claims at issue are not identical, they are not patentably distinct from each other because:

Claim 1 of 8,968,924 recites

> A composition used in lithium ion batteries comprising: discrete carbon nanotubes having ion active material attached to their surface, wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube, and wherein the ion active material comprise a lithium metal salt and an element selected from the group consisting of: iron, manganese, cobalt, copper, nickel, vanadium, titanium, and mixtures thereof.

This claim is broader in scope than instant independent claim 1 and 2 and identically recites the claimed ranges of the aspect ratio and oxidation levels of the carbon nanotubes, the crystal/material layers, and the lithium metal salt elements.

Claim 2 of the 8,968,924 and instant claim 6 recite the same graphene or oxygenated graphene.

Claim 3 of the 8,968,924 and instant claim 7 recite identically the same range of the graphene/nanotube weight ratio.

Claim 4 of the 8,968,924 and instant independent claim 10 recite same the range of weight percentage and the lithium metal salt is obvious in the instant application based on instant claim 1.

Claim 5 of the 8,968,924 recites attachment which is broader than instant independent claim 1 which recites ionic attachment attachment.

Response to Arguments

Applicant's arguments filed 11/6/2015 have been fully considered but they are not persuasive.

The applicant's argument toward the newly claimed ionic attachment is not persuasive for the reasons set forth in the prior art rejection above. The applicant is encourage to submit evidence and/or arguments showing that there is a difference between the prior art and the instant claims regarding ionic attachment.

The applicant argues that "Niu teaches away from oxidized, non- agglomerated, discrete nanotubes by virtue of the fact that Niu relates to agglomerates of nanotubes that increase in size with oxidation. (Niu, col. 10, line 40). Niu refers to its agglomerated nanotubes as a "fuzzy tennis ball" or "loose bundles". (Niu, col. 10, lines 60-65)." This argument is not persuasive as instant claim language is not so descriptive as to preclude the teachings of the prior art.

The applicant's argument regarding oxidized carbon nanotubes in the first full paragraph on page 7 of the remarks is (1) not in scope with the instant claims and (2) is not persuasive:

1. The instant claims positively claim oxidation levels of 1% to 15% while the applicant appears to be arguing that no oxide groups are preferable; therefore this argument is not commensurate in scope with the instant claims.

2. As previously presented, Li does not teach the level of oxidation and Niu is relied upon to remedy this deficiency; Niu teaches an oxidation level of 3.8%, which is a point within the claimed range as noted above. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

*Also note that Li acknowledges some level of oxidation and that Li seeks to minimize this oxidation as indicated by the page 666 first column last paragraph of the Li reference and as indicated in the remarks; this teaching itself could be in scope with the relatively low claimed range- 1-15%.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the structure of the discrete and exfoliated carbon nanotubes, as argued by the applicant on page 7 last paragraph of the remarks has relied on features as discussed in the remarks and in [0024] of the instant specification) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from

the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Furthermore, the applicant's arguments with respect to the instant claims have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

Conclusion

The prior art **previously** made of record and not relied upon is considered pertinent to applicant's disclosure:

Maxim N. Tchoul,†, Warren T. Ford,*,†, Giulio Lolli,‡, Daniel E. Resasco,‡ and, and Sivaram Arepalli, *Effect of Mild Nitric Acid Oxidation on Dispersability, Size, and Structure of Single-Walled Carbon Nanotubes,* Chemistry of Materials 2007 19 (23), 5765-5772, teaches that the oxidation of single-walled carbon nanotubes (SWNTs) with nitric acid increases their dispersability in water, methanol, and N,N-dimethylformamide, see e.g. abstract.

Bo Jin, En Mei Jin, Kyung-Hee Park, Hal-Bon Gu, *Electrochemical properties of $LiFePO_4$-multiwalled carbon nanotubes composite cathode materials for lithium polymer battery*, Electrochemistry Communications, Volume 10, Issue 10, October 2008, Pages 1537-1540, teaches a composite material relevant to the claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip A. Stuckey, PhD whose telephone number is

(571)272-9875. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on (571)272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Philip A. Stuckey/
Examiner, Art Unit 1723

/MILTON I CANO/
Supervisory Patent Examiner
Art Unit 1723

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13529797	BOSNYAK ET AL.
	Examiner	Art Unit
	ERIC CONNELLY	1723

CPC- SEARCHED		
Symbol	Date	Examiner
H01M 4/587	07/09/2014	EMC
H01M 4/525 4/505	11 March 2015, 2/1/16	PS

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
429	231.8	06/24/2014	EMC

SEARCH NOTES		
Search Notes	Date	Examiner
429 Consultation with Nicholas D'Aniello	06/24/2014	EMC
429 Consultation with Brian Talbot	07/09/2014	EMC
Inventor Search in PALM	06/24/2014	EMC
Assignee Search in EAST	06/24/2014	EMC
Application 14/128392 History and Search Reviewed	06/24/2014	EMC
EAST Keyword Search	06/24/2014	EMC
Inventor search in PALM	11 March 15, 2/1/16	PS
EAST search History Report	11 March 15, 2/1/16	PS
Consulted Milton Cano	11 March 15, 1/21/16	PS
NPL Google search: lithium ion battery solvent additives carbon nanotube LiFePO4	11 March 15	PS
Consulted Nick D'Aneillo	12 March 15	PS

/PHILIP A STUCKEY/ Examiner.Art Unit 1723	

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/PHILIP A STUCKEY/ Examiner.Art Unit 1723	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L7	21649	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:12
L8	19710	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:12
L10	25934	7 8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:12
L12	15	10 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6) and ("LiMnPO.sub.4" "Li.sub.3MnPO.sub.4")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:43
L13	1280	"LiMnPO.sub.4" and H01M$	US-PGPUB; USPAT	OR	ON	2016/02/01 14:43
L14	24	13 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6) and ("LiMnPO.sub.4" "Li.sub.3MnPO.sub.4")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:44
L15	15	14 not 12	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:44
L18	29	13 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) and ("LiMnPO.sub.4" lithium near4 manganese near4 phosphate)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2016/02/01 14:49

			IBM_TDB			
L19	25	13 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same3 (active near3 material)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:52
L20	17	10 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) and ("LiMnPO.sub.4" lithium near4 manganese near4 phosphate)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:52
L21	91	10 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:54
L22	82	10 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:55
L23	57	10 and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same (bond$4 attach$4) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 14:56
L24	117	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same (bond$4 attach$4) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 15:00
L25	26	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$6 chemically) same (bond$4 attach$4) same2 (active near3 material) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 15:01
L26	61	h01m$ and (carbon near4 nanotube mwcnt swcnt dwcnt carbonnanotube $4carbon near4 nanotube) same (ionic$4) same2 (active near3 material) not (ionic$6 adj liquid)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/02/01 15:07
S1	1	"20120328946".pn.	US-PGPUB; USPAT	OR	ON	2015/03/04 19:50
S2	18107	H01M4/525.cpc.	US-PGPUB;	OR	ON	2015/03/04

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			19:53
S3	16328	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S4	12562	S2 and S3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S5	371	S4 and carbon near4 nanotube	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:56
S6	43	S5 and ratio with lithium with ion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:56
S7	7	("20110104551" | "20110311876" | "20110311876" | "20100159331").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 11:39
S8	3	("20110104551" | "20110311876" | "20110311876" | "20100159331").PN.	US-PGPUB; USPAT	OR	ON	2015/03/11 11:39
S9	18138	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S10	16364	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S11	12592	S9 and S10	US-PGPUB; USPAT; USOCR;	OR	ON	2015/03/11 15:35

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S12	21	S11 and carbon near4 nanotube with (weight "wt" "wt%" "wt %")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S13	6	S12 and ratio with lithium with ion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:36
S14	9	S12 and carbon near4 nanotube with (weight "wt" "wt%" "wt %") and aspect near3 ratio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 20:43
S15	6	S12 and carbon near4 nanotube with (weight "wt" "wt%" "wt %") and aspect near3 ratio and graphene	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 20:43
S16	22	carbon near4 nanotube with oxidation near2 level	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:19
S17	5	S11 and S16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:19
S18	17	S16 not S17	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:20
S19	11	S11 and carbon near4 nanotube with function$7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:22
S20	15	S11 and carbon near4 nanotube same	US-PGPUB;	OR	ON	2015/03/11

		function$7	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			21:23
S21	4	S20 not S19	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:23
S22	464164	H01M$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:24
S23	632	S22 and carbon near4 nanotube with function$7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:24
S24	35	carbon near4 nanotube same oxidation near2 level	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:25
S25	18	S22 and S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:25
S26	5	S11 and S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:26
S30	1	"7070753".pn.	US-PGPUB; USPAT	OR	ON	2015/03/11 21:33
S31	5	S12 and carbon near4 nanotube with lithium near5 salt	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:35
S32	35	S22 and carbon near4 nanotube with lithium near5 salt	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2015/03/11 22:36

			JPO; DERWENT; IBM_TDB			
S33	6	S22 and carbon near4 nanotube with lithium near5 salt with weight	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:36
S34	29	S22 and carbon near4 nanotube same lithium near5 salt same (weight ratio)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:39
S35	5	S12 and carbon near4 nanotube same lithium near5 salt same (weight ratio)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:39
S40	5	("20110104551" | "7070753" | "20110311876" | "20110311876" | "20100176337" | "20100159331").PN.	US-PGPUB; USPAT	OR	ON	2016/01/21 18:06
S42	3	("8808909" "8968924" "9065132").PN.	US-PGPUB; USPAT	OR	ON	2016/01/22 08:21
S43	15	"25335609".FMID.	US-PGPUB; USPAT; FPRS	OR	ON	2016/01/28 16:59

EAST Search History (Interference)

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2/1/2016 5:16:17 PM
C:\Users\pstuckey\Documents\EAST\Workspaces\13529797.wsp

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 11/12/2015

Andrews Kurth LLP
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Houston, TX 77002

EXAMINER
STUCKEY, PHILIP A

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
11/12/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patenttrademarks@andrewskurth.com

Applicant-Initiated Interview Summary	**Application No.** 13/529,797	**Applicant(s)** BOSNYAK ET AL.	
	Examiner Philip A. Stuckey, PhD	**Art Unit** 1723	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Philip A. Stuckey*.

(2) *Milton Cano*.

(3) *Gregory Porter*.

(4) *Steve Krupp*.

Date of Interview: *05 November 2015*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☒102 ☒103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1*.

Identification of prior art discussed: *of record*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

The applicant's representatives presented a proposed claim amendment and a discussion perused related to the structure of the claimed discrete and exfoliated carbon nanotubes and the oxidation levels of the nanotubes. The applicant was encouraged to further define the structural limitations that define over the prior art. The applicant's representatives were also reminded that the limitations of the claims need to define over the prior art in terms of structure rather than function per MPEP 2114.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/Philip A. Stuckey/ Examiner, Art Unit 1723	/MILTON I CANO/ Supervisory Patent Examiner, Art Unit 1723

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

———

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	13529797	Filing Date	2012-06-21	Docket Number (if applicable)	DENA-0008US (223156)	Art Unit	1723
First Named Inventor	Clive P. Bosnyak			Examiner Name	Philip A. Stuckey		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 5008927

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Gregory L. Porter/	Date (YYYY-MM-DD)	2015-11-06
Name	Gregory L. Porter	Registration Number	40131

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Clive P. Bosnyak, *et al.*
Serial No.:	13/529,797
Filed:	June 21, 2012
Art Unit:	1723
Examiner:	Phillip A. Stuckey
Conf. No.:	1004
For:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

Mail Stop RCE
Commissioner for Patents
Box AF
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CONTINUED EXAMINATION, INTERVIEW SUMMARY, AND SUPPLEMENTAL AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION OF MARCH 24, 2015

Dear Examiner Stuckey:

Thank you for courtesies extended by you and Mr. Cano to myself and Steve Krupp during the November 5th, 2015 telephonic interview to discuss the pending claims and the Li and Niu references. While an agreement on the claims was not reached the interview was a productive exchange of views. As discussed, the instant RCE is being submitted with amendments discussed during the interview.

Amendments to the Claims are reflected in the listing of claims that begin on page 2 of this paper.

Remarks begin on page 6 of this paper.

IN THE CLAIMS:

1. (Currently Amended) A composition useful for lithium ion batteries comprising: discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active material ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

2. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise a lithium metal salt and an element selected from the group consisting of: iron, manganese, cobalt, copper, nickel, vanadium, titanium, and mixtures thereof.

3. (Previously presented) The composition of claim 2, wherein the lithium metal salt has an olivine crystal structure and wherein the lithium metal salt is $LiFePO_4$ or $LiMnPO_4$.

4. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise tin, silicon, copper, antimony, aluminum, germanium, titanium, or mixtures thereof.

5. (Cancelled).

6. (Original) The composition of claim 1, further comprising graphene or oxygenated graphene.

7. (Previously presented) The composition of claim 6, wherein the weight ratio of graphene to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

8. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

   a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level 1% to 15% percent by weight;

b) mixing the carbon nanotubes with a high boiling point liquid;

c) adding reagents in correct balance to synthesize a lithium salt;

d) reacting the mixture at a temperature to form the lithium salt while sonicating the mixture;

e) separating the solid discrete carbon nanotube salts from the liquid; and

f) drying and annealing the solid discrete carbon nanotube salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

9. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level of 1% to 15% by weight;

b) mixing the carbon nanotubes and a lithium salt in a liquid with surfactant;

c) sonicating the liquid carbon nanotube/lithium salt mixture;

d) separating the solid salts from the liquid; and

e) drying and annealing the solid discrete carbon nanotubes with attached lithium salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

10. (Currently Amended) A composition useful for lithium ion batteries, comprising discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials ionically attached to their surface, and wherein the carbon nanotubes are in a weight ratio of carbon nanotubes to lithium salts of 0.1% to 10% and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

11. (Currently Amended) A composition useful for lithium ion batteries, comprising oxidized discrete, non-agglomerated, and exfoliated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials attached to their surface, and wherein the carbon nanotubes are uniformly dispersed without clustering on a dimension scale of less than about 1 micrometer and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

12. (Currently Amended) A composition useful for lithium ion batteries, comprising uniformly dispersible oxidized , non-agglomerated carbon nanotubes having a surface, and mixtures of ion active materials comprising migratable ions said materials comprising crystals or layers of lithium ion active material, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials ionically attached to their surface and wherein the discrete carbon nanotubes comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities, and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

13. (Original) The composition of claim 12, wherein the crystals or layers of lithium ion active materials are chemically attached to the surface of the dispersible oxidized carbon nanotubes.

14. (Previously presented) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

15. (Previously presented) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

16. (Previously presented) The composition of claim 10 where the ratio of lithium ion to other

total ions in the ion active materials is from 3:1 to 25:1.

17. (Previously presented) The composition of claim 10 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

18. (Previously presented) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

19. (Previously presented) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

20. (Previously presented) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

21. (Previously presented) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

REMARKS

Pending in the current application are Claims 1-7 and 10-21. All independent claims, Claims 1, 10, 11, and 12, have been amended to provide antecedent basis for "surface" and "crystals or layers of lithium ion active material" as suggested in the interview. The independent claims have also been amended to specify that the nanotubes are "non-agglomerated" as suggested in the interview with support found at, for example, Figure 1. In addition, the independent claims have been amended to specify that the nanotubes "comprise oxidized species selected from the group consisting of carboxylic, ketone, or hydroxyl functionalities." Support is found at, for example, paragraph [0034] of the published application US 2012/0328946. Lastly, the independent claims have been amended to specify that the crystals or layers of lithium ion active materials are "ionically" attached to the nanotube surface. Support is found at, for example, paragraph [0026] of the published application US 2012/0328946. No new matter has been added. Applicants respectfully request reconsideration of this Application in view of the above Amendments and the following remarks.[1]

I. As Amended Claims 1-7 and 10-21 Are Patentable Over the Cited References as Li Does Not Have Lithium Ion Active Material Ionically Attached to Nanotubes and Teaches Away from Oxidation While Niu is Agglomerated and Also Lacks Lithium Ion Active Material Ionically Attached to Nanotubes

The claims were rejected under 35 U.S.C. §103(a) (pre-AIA) as being unpatentable over Li 2006 (Li) in view of Niu et al. U.S. 7,070,753 (Niu).

The primary reference of **Li does not have lithium ion active material ionically attached to nanotubes**. Instead, Li simply mixes the materials and therefore, at best, the materials have affinity via Van der Waals forces as stated on page 6 of the Final Office Action. The secondary reference of Niu does not remedy this deficiency. In fact, **Niu teaches away from oxidized, non-agglomerated, discrete nanotubes** by virtue of the fact that Niu relates to agglomerates of nanotubes that increase in size with oxidation. (Niu, col. 10, line 40). Niu refers to its agglomerated nanotubes as a "fuzzy tennis ball" or "loose bundles". (Niu, col. 10, lines 60-65).

Li's LiFePO4 particles are in the presence of the tubes in a mixture but not **ionically attached** as claimed above. Li, et al describes his improvement occurred "due to that the interface

[1] The prior Office Action stated that the claims may not have priority to provisional application 61/500,560. Applicants disagree but believe that there is no need to elaborate since the cited references at issue, Li and Niu, pre-date the provisional application filing date.

was filled with MWCNTs." (p.666 col 2, last paragraph) and that LiFePO4 is "mixed with acetylene black and MWCNTs" (p.666 col. 1, last paragraph). This description confirms Li's materials are not **ionically attached to nanotubes**. That Li is a simple mixture is also confirmed by Li's SEM images which are reproduced below.

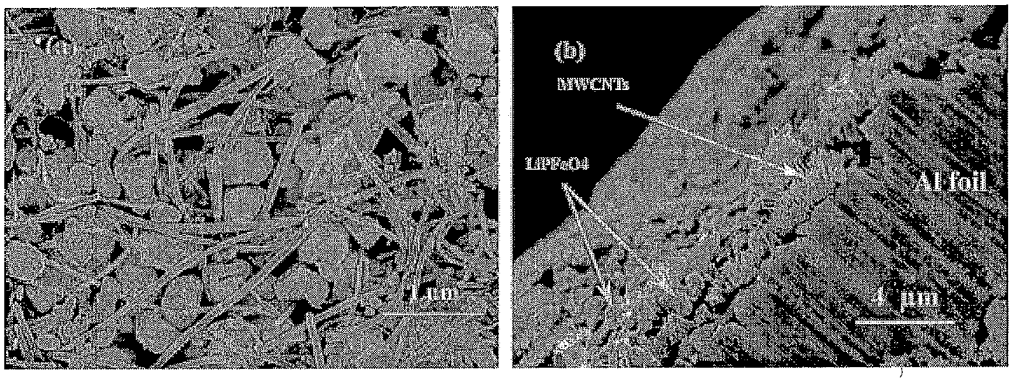


Fig. 2. SEM images of $LiFePO_4$/MWCNTs composite cathode (a: plane section; b: cross section).

What's more, Li teaches directly away from oxidized nanotubes as claimed. That is, Li seeks to delete any oxide groups on his crystallized nanotubes to "prevent irreversible reactions and improve cycle efficiency." (p.666 col. 1, last paragraph). This is a second, independent teaching away from the instant claims that is not remedied with Niu.

II. Conclusion

It is submitted that the instant claims are patentable and a Notice of Allowance is requested. The Commissioner is hereby authorized to charge any required fees to our Andrews Kurth LLP Deposit Account No. 50-0897 (223156/DENA008). The Commissioner is also authorized to credit any fee overpayment to the aforementioned Deposit Account.

The Examiner is invited to call the undersigned attorney at 713-220-4621, if a telephone call could help resolve any item.

Respectfully submitted,

/Gregory L. Porter/

Gregory L. Porter
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Date: November 6, 2015

Electronic Patent Application Fee Transmittal

Application Number:	13529797
Filing Date:	21-Jun-2012
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Filer:	Gregory L. Porter/Jeanne Dunn
Attorney Docket Number:	DENA-0008 (223156)

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 4 months with $0 paid	2254	1	1100	1100
Miscellaneous:				
Request for Continued Examination	2801	1	600	600
		Total in USD ($)		**1700**

Electronic Acknowledgement Receipt	
EFS ID:	24008067
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	130577
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (223156)
Receipt Date:	06-NOV-2015
Filing Date:	21-JUN-2012
Time Stamp:	12:00:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1700
RAM confirmation Number	8820
Deposit Account	500897
Authorized User	PORTER, GREGORY L.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	RCE.pdf	639407 72b67a47d153331997b676ff5c754ec69a6be02f	no	3
Warnings:					
Information:					
2	Amendment Submitted/Entered with Filing of CPA/RCE	RFOA_03242015.pdf	423550 7920235270bbc8371aed9e4359e4407cf6b6f20c	no	8
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32872 45d0345dae08ea259dd763063c3653babf7812c8	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1095829		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/529,797	Filing Date 06/21/2012	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	11/06/2015	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 21	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 6	Minus	***6	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/NICOLE C. LAWRENCE/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)	1004

130577 7590 10/07/2015

Andrews Kurth LLP
600 Travis Street
Suite 4200
Houston, TX 77002

EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
10/07/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patenttrademarks@andrewskurth.com

Examiner-Initiated Interview Summary	**Application No.** 13/529,797	**Applicant(s)** BOSNYAK ET AL.	
	Examiner Philip A. Stuckey, PhD	**Art Unit** 1723	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Philip A. Stuckey*. (3)_____.

(2) *Gregory Porter*. (4)_____.

Date of Interview: *28 September 2015*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☒102 ☒103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1 and 5*.

Identification of prior art discussed: *of record*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

The details of the declaration and remarks as indicated in the attached advisory action were discussed with Gregory Porter, applicant's attorney of record. The ranges of oxidation levels of the carbon nanotubes of the instant application and those of Ni were also discussed. The definition of discrete and exfoliated carbon nanotubes was discussed. The applicant was invited to submit a preliminary draft amendment by means of an applicant initiated interview if they would find it helpful prior to their next reply..

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/Philip A. Stuckey/ Examiner, Art Unit 1723	/MILTON I CANO/ Supervisory Patent Examiner, Art Unit 1723

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 13/529,797	**Applicant(s)** BOSNYAK ET AL.	
	Examiner Philip A. Stuckey, PhD	**Art Unit** 1723	**AIA (First Inventor to File) Status** No

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 24 September 2015 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☐ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires _____months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☒ The Notice of Appeal was filed on *24 September 2015*. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): (a) ☐ will not be entered, or (b) ☒ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☒ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on *9/24/2015.*
9. ☒ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☒ Other: AFCP 2.0 Decision; Interview Summary of Record.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: none.
   Claim(s) objected to: none.
   Claim(s) rejected: 1-4,6,7 and 10-21.
   Claim(s) withdrawn from consideration: 8 and 9.

/MILTON I CANO/ Supervisory Patent Examiner, Art Unit 1723	/Philip A. Stuckey/ Examiner, Art Unit 1723

Continuation of 12. does NOT place the application in condition for allowance because: The instant amendment will be entered and the previous rejection over Li in view of Niu is maintained for the reasons recited in the previously issued final rejection. The amendement to the specification will be entered and the previous specification and claim objections regarding spelling are withdrawn.
In response to the declaration filed 9/24/2015, the declaration does not address the rejection of record. The teachings of Li are recited for teaching discrete and exfoliated carbon nanotubes; this declaration is directed toward Niu '753 which is used in combination with Li. Therefore the declaration is not commensurate in scope with the closest prior art of record.
The applicant further argues in the remarks (page 6, last paragraph) that Li does not specify the acid concentration use or specifics related to the carbon nanotube treatment. These arguments are not commensurate in scope with the instant claims as the instant claims do not positively recite chemical or mechanical treatment of the discrete and exfoliated carbon nanotubes. Li does state that multi-walled carbon nanotubes were soaked in nitric acid and shows and SEM of the LiFePO4/MWCNT, see section 2 experimental and figure 2, page 664..

Examiner-Initiated Interview Summary	**Application No.** 13/529,797	**Applicant(s)** BOSNYAK ET AL.	
	Examiner Philip A. Stuckey, PhD	**Art Unit** 1723	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Philip A. Stuckey*. (3)_____.

(2) *Gregory Porter*. (4)_____.

Date of Interview: *28 September 2015*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☒102 ☒103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1 and 5*.

Identification of prior art discussed: *of record*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

The details of the declaration and remarks as indicated in the attached advisory action were discussed with Gregory Porter, applicant's attorney of record. The ranges of oxidation levels of the carbon nanotubes of the instant application and those of Ni were also discussed. The definition of discrete and exfoliated carbon nanotubes was discussed. The applicant was invited to submit a preliminary draft amendment by means of an applicant initiated interview if they would find it helpful prior to their next reply..

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/Philip A. Stuckey/ Examiner, Art Unit 1723	/MILTON I CANO/ Supervisory Patent Examiner, Art Unit 1723

AFCP 2.0 Decision	Application No.	Applicant(s)
	13/529,797	BOSNYAK ET AL.
	Examiner	Art Unit
	Philip A. Stuckey, PhD	1723

This is in response to the After Final Consideration Pilot request filed 24 September 2015.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

   ☐ An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.

   ☐ A non-broadening amendment to at least one independent claim was not submitted.

   ☐ A proper AFCP 2.0 request was submitted in response to the most recent final rejection.

   ☐ Other:

2. **Proper Request**

   A. After final amendment submitted with the request will not be treated under AFCP 2.0.
   The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

   ☐ The after final amendment will be treated under pre-pilot procedure.

   B. Updated search and/or completed additional consideration.
   The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

   ☐ 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.

   ☒ 2. The after final amendment would not overcome all of the rejections in the most recent final Office action. See attached interview summary for further details.

   ☐ 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for further details.

   ☐ 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.

   ☐ 5. Other:

   Examiner Note: Please attach an interview summary when necessary as described above.

OK TO ENTER: /PS/

ATTORNEY DOCKET NO.: DENA-0008 (223156) **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Clive P. Bosnyak, *et al.*
Serial No.:	13/529,797
Filed:	June 21, 2012
Art Unit:	1723
Examiner:	Phillip A. Stuckey
Conf. No.:	1004
For:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

Commissioner for Patents
Box AF
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

RESPONSE TO FINAL OFFICE ACTION OF MARCH 24, 2015 AND REQUEST FOR AFTER FINAL PILOT CONSIDERATION PROGRAM

In response to the communication from the Examiner dated March 24, 2015, having a deadline for response expiring June 24, 2015, extended for three months by petition enclosed herewith, Applicants hereby amend the application as follows and submit the following remarks. In addition, a request for consideration under the AFCP program (Form PTO/SB/434) is enclosed along with a notice of appeal. As required, the response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claims in any aspect. In fact, all independent claims have been amended to incorporate the limitation of dependent Claim 5 such that no new search is required. Applicant is willing and available to participate in an interview with the Examiner concerning the present response.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims that begin on page 3 of this paper.

Remarks begin on page 6 of this paper.

IN THE SPECIFICATION:

Please replace paragraph [0009] with the following paragraph which shows the full text of the replacement paragraph with markings to show all the changes relative to the previous version of the paragraph:

[0009] One aspect of the invention is a composition useful for lithium ion batteries, comprising discrete carbon nanotubes having attached to their surface lithium ion active materials in the form of nanometer sized crystals or layers. For a cathode, the lithium ion active material comprises a lithium metal salt which may further comprise iron, manganese, cobalt, copper, nickel, vanadium, titanium, or mixtures thereof. The composition can further comprise the lithium metal salt with an olivine crystal structure. For an anode, the lithium ion active material may comprise carbon, tin, silicon, copper, antimony, aluminum, germanium, titanium or mixtures thereof. The discrete carbon nanotubes of the composition preferably have an aspect ratio of 10 to 500 and oxidation levels from 1 to 15 weight percent of the carbon nanotube. The composition can further comprise graphene or oxygenated graphene. In one embodiment, the weight ratio of ~~grapheme~~ graphene to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (137124.00041)

CONFIRMATION NO. 1004

117364
Molecular Rebar Design, LLC
Jackson Walker L.L.P.
901 Main Street, Suite 6000
Dallas, TX 75202

POWER OF ATTORNEY NOTICE

OC000000077704970

Date Mailed: 09/30/2015

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/22/2015.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/fstephanos/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (223156)

CONFIRMATION NO. 1004

130577
Andrews Kurth LLP
600 Travis Street
Suite 4200
Houston, TX 77002

POA ACCEPTANCE LETTER

OC000000077704987

Date Mailed: 09/30/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/22/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/fstephanos/

Doc Code: A.NE.AFCP
Document Description: After Final Consideration Pilot Program Request

PTO/SB/434 (05-13)

CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

Practitioner Docket No.:	Application No.:	Filing Date:
DENA-0008US (223156)	13/529,797	June 21, 2012
First Named Inventor:	**Title:**	
Clive P. Bosnyak	Lithium Ion Batteries Using Discrete Carbon Nanotubes, Methods for Production Thereof...	

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.

1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (*e.g.*, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).
2. The above-identified application contains an outstanding final rejection.
3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect.
4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection.
5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response.
6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web).
7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.]
8. By filing this certification and request, applicant acknowledges the following:
   - Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0.
   - The examiner will verify that the AFCP 2.0 submission is compliant, *i.e.*, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions:
     - The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, by mailing an advisory action.
     - If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview.
       - The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate.
       - If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.

Signature	Date
/Gregory L. Porter/	2015-09-24
Name (Print/Typed) Gregory L. Porter	**Practitioner Registration No.** 40131

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.*

[✓] * Total of 1 forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Clive P. Bosnyak, *et al.*
Serial No.:	13/529,797
Filed:	June 21, 2012
Art Unit:	1723
Examiner:	Phillip A. Stuckey
Conf. No.:	1004
For:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

Commissioner for Patents
Box AF
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

RESPONSE TO FINAL OFFICE ACTION OF MARCH 24, 2015 AND REQUEST FOR AFTER FINAL PILOT CONSIDERATION PROGRAM

In response to the communication from the Examiner dated March 24, 2015, having a deadline for response expiring June 24, 2015, extended for three months by petition enclosed herewith, Applicants hereby amend the application as follows and submit the following remarks. In addition, a request for consideration under the AFCP program (Form PTO/SB/434) is enclosed along with a notice of appeal. As required, the response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claims in any aspect. In fact, all independent claims have been amended to incorporate the limitation of dependent Claim 5 such that no new search is required. Applicant is willing and available to participate in an interview with the Examiner concerning the present response.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims that begin on page 3 of this paper.

Remarks begin on page 6 of this paper.

IN THE SPECIFICATION:

Please replace paragraph [0009] with the following paragraph which shows the full text of the replacement paragraph with markings to show all the changes relative to the previous version of the paragraph:

[0009] One aspect of the invention is a composition useful for lithium ion batteries, comprising discrete carbon nanotubes having attached to their surface lithium ion active materials in the form of nanometer sized crystals or layers. For a cathode, the lithium ion active material comprises a lithium metal salt which may further comprise iron, manganese, cobalt, copper, nickel, vanadium, titanium, or mixtures thereof. The composition can further comprise the lithium metal salt with an olivine crystal structure. For an anode, the lithium ion active material may comprise carbon, tin, silicon, copper, antimony, aluminum, germanium, titanium or mixtures thereof. The discrete carbon nanotubes of the composition preferably have an aspect ratio of 10 to 500 and oxidation levels from 1 to 15 weight percent of the carbon nanotube. The composition can further comprise graphene or oxygenated graphene. In one embodiment, the weight ratio of ~~grapheme~~ graphene to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

IN THE CLAIMS:

1. (Currently Amended) A composition useful for lithium ion batteries comprising: discrete and exfoliated carbon nanotubes, and mixtures of ion active materials comprising migratable ions, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active material attached to their surface and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

2. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise a lithium metal salt and an element selected from the group consisting of: iron, manganese, cobalt, copper, nickel, vanadium, titanium, and mixtures thereof.

3. (Previously presented) The composition of claim 2, wherein the lithium metal salt has an olivine crystal structure and wherein the lithium metal salt is $LiFePO_4$ or $LiMnPO_4$.

4. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise tin, silicon, copper, antimony, aluminum, germanium, titanium, or mixtures thereof.

5. (Cancelled).

6. (Original) The composition of claim 1, further comprising graphene or oxygenated graphene.

7. (Currently amended) The composition of claim 6, wherein the weight ratio of ~~grapheme~~ graphene to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

8. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

   a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level 1% to 15% percent by weight;

   b) mixing the carbon nanotubes with a high boiling point liquid;

   c) adding reagents in correct balance to synthesize a lithium salt;

d) reacting the mixture at a temperature to form the lithium salt while sonicating the mixture;

e) separating the solid discrete carbon nanotube salts from the liquid; and

f) drying and annealing the solid discrete carbon nanotube salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

9. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level of 1% to 15% by weight;

b) mixing the carbon nanotubes and a lithium salt in a liquid with surfactant;

c) sonicating the liquid carbon nanotube/lithium salt mixture;

d) separating the solid salts from the liquid; and

e) drying and annealing the solid discrete carbon nanotubes with attached lithium salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

10. (Currently Amended) A composition useful for lithium ion batteries, comprising discrete and exfoliated carbon nanotubes, and mixtures of ion active materials comprising migratable ions, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials attached to their surface, and wherein the carbon nanotubes are in a weight ratio of carbon nanotubes to lithium salts of 0.1% to 10% and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

11. (Currently Amended) A composition useful for lithium ion batteries, comprising oxidized carbon nanotubes, and mixtures of ion active materials comprising migratable ions, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials attached to their surface, and wherein the carbon nanotubes are uniformly dispersed without clustering on a dimension scale of less than about 1 micrometer and wherein the discrete

carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

12. (Currently Amended) A composition useful for lithium ion batteries, comprising uniformly dispersible oxidized carbon nanotubes, and mixtures of ion active materials comprising migratable ions, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes have crystals or layers of lithium ion active materials attached to their surface and wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

13. (Original) The composition of claim 12, wherein the crystals or layers of lithium ion active materials are chemically attached to the surface of the dispersible oxidized carbon nanotubes.

14. (New) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

15. (New) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

16. (New) The composition of claim 10 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

17. (New) The composition of claim 10 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

18. (New) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

19. (New) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

20. (New) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

21. (New) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

REMARKS

Pending in the current application are Claims 1-7 and 10-21. Paragraph [00009] of the specification and Claim 7 have been amended as suggested to correct the spelling of graphene. All independent claims, Claims 1, 10, 11, and 12, have been amended to include the limitation of dependent Claim 5 that "the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube". Dependent Claim 5 has been cancelled. No new matter has been added. Applicants respectfully request reconsideration of this Application in view of the above Amendments and the following remarks.[1]

I. As Amended Claims 1-7 and 10-21 Are Patentable Over the Cited References as Niu Teaches Away from Discrete Nanotubes and a Prior Replication of Niu Confirmed Niu's Nanotubes are Agglomerated, Not Discrete

Prior dependent Claim 5 was rejected under 35 U.S.C. §103(a) (pre-AIA) as being unpatentable over Li 2006 (Li) in view of Niu et al. U.S. 7,070,753 (Niu). The limitations of dependent Claim 5 (aspect ratio and oxidation level) have now been included in all the independent claims. As described below, Li and Niu does not lead to the skilled artisan to all the underlying limitations of any of the amended independent claims.

A. Niu Teaches Away from Discrete, Oxidized Nanotubes As Nanotube Agglomerations Increase in Size with Oxidation

As stated in the Office Action with respect to former dependent Claim 5, Li is silent regarding "the aspect ratio and oxidation level of the carbon nanotubes." (Office Action, p.7). Therefore, the Office Action looks to Niu to remedy the deficiency. However, neither Li nor Niu even pertain to discrete carbon nanotubes. That is, Li makes no mention of discrete carbon nanotubes and, in fact, the skilled artisan would not expect Li to have discrete carbon nanotubes since Li nowhere specifies the acid concentration or specifics related to mechanical treatment both of which can be important to obtain discrete nanotubes in various processes. What's more, as described below, the skilled artisan seeking discrete nanotubes of a particular aspect ratio or oxidation level would be led away from the suggested combination because Niu teaches directly away from discrete carbon nanotubes.

[1] The prior Office Action stated that the claims may not have priority to provisional application 61/500,560. Applicants disagree but believe that there is no need to elaborate since the cited references at issue, Li and Niu, pre-date the provisional application filing date.

That Niu teaches away is confirmed by the fact that Niu's agglomerates of nanotubes increase in size with oxidation. Specifically, Niu teaches that the oxidized aggregates are "are increased in size by at least 5 percent and may be increased in size by at least 10 percent or more." (Niu, col. 10, line 40). Niu refers to its treated nanotubes as a "fuzzy tennis ball" or "loose bundles". (Niu, col. 10, lines 60-65). The skilled artisan understands, of course, that the terms "fuzzy tennis ball" and "loose bundles" are inconsistent with having "discrete" nanotubes as claimed in all the independent claims. This agglomeration of Niu was previously confirmed experimentally by Applicant.

B. Applicant Previously Experimentally Confirmed Niu's Oxidized Nanotubers Were Not Discrete

Applicant's prior declaration that was used in establishing the patentability of U.S. Patent No. 8,993,161 is attached hereto as Exhibit A. In that Declaration, Dr. Henderson replicated two examples of Niu. As a result, Dr. Henderson concluded that Niu "does not produce discrete carbon nanotubes as seen through a scanning electron microscope." (Exhibit A, paragraphs 6-7).

C. The Skilled Artisan Would Not Be Led to Discrete Nanotubes with the Claimed Oxidation Level or Aspect Ratio Based on Li and Niu

Based on the above, the skilled artisan would not combine Li with Niu as suggested because based on the teachings the skilled artisan would understand that oxidizing Li's nanotubes with Niu's aspect ratio would lead to larger amounts of agglomeration and yield non-discrete nanotubes resembling a "fuzzy tennis ball" or "loose bundles". Accordingly, the claimed invention of the amended independent claims is non-obvious over the suggested combination and the claims should be allowed.

II. Conclusion

It is submitted that the instant claims are patentable and a Notice of Allowance is requested. The Commissioner is hereby authorized to charge any required fees to our Andrews Kurth LLP Deposit Account No. 50-0897 (223156/DENA008). The Commissioner is also authorized to credit any fee overpayment to the aforementioned Deposit Account.

The Examiner is invited to call the undersigned attorney at 713-220-4621, if a telephone call could help resolve any item.

Respectfully submitted,

/Gregory L. Porter/

Gregory L. Porter
Registration No. 40,131

Andrews Kurth LLP
600 Travis, Suite 4200
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Fax: (713) 238-7169
pat-tmk@andrewskurth.com

Date: September 24, 2015

EXHIBIT A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Clive P. Bosnyak, *et al.*

Serial No.: 13/529,792

Filing Date: June 21, 2012

Art Unit: 1729

Examiner: AMPONSAH, Osei K.

Conf. No.: 1033

For: LEAD-ACID BATTERY FORMULATIONS CONTAINING DISCRETE CARBON NANOTUBES

Commissioner of Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

HENDERSON DECLARATION UNDER 37 C.F.R §1.132

Nancy Henderson, Ph.D., declares that:

1. I am over 21 years old.

2. I received my Ph.D. in Mechanical Engineering from the University of Texas at Austin.

3. I am currently the Lab Director of Molecular Rebar Design, LLC ("MRD") in Austin, Texas, formally Designed Nanotube, LLC of Austin, Texas, the name of the Assignee as appears on U.S. Patent Application Serial No. 13/529,792 ("the '792 Patent Application").

4. I am not a named inventor of the patent application that is referenced above, the '792 Patent Application. I am however, familiar with the '792 Patent Application. I am also familiar with the Office Action dated August 11, 2014. Further, I am familiar with the references cited therein, namely, U.S. Patent No. 7,070,753 ("the '753 Patent").

5. I was asked by Dr. Clive Bosnyak, who is a named inventor on the '792 Patent Application, to run experiments to determine if the examples in one of the cited references, the '753 Patent, actually produce discrete carbon nanotubes.

6. On page 5 of the Office Action dated August 11, 2014, relating to the instant '792 Patent Application, the Examiner cited Table 5 (which lists Example 10) of the '753 Patent to show that the '753 Patent teaches "disassembled (disentangled) discrete carbon nanotubes that have an oxygen content of 3.8%." I confirm that the attached Experiment 1 describes the experiments relating to Example 10 of the '753 Patent in detail and includes true, accurate and factual experimental results that show Example 10 of the '753 Patent does not produce discrete carbon nanotubes as seen through a scanning electron microscope.

7. I confirm that the attached Experiment 2 describes the experiments relating to Example 23 of the '753 Patent in detail and includes true, accurate and factual experimental results that show Example 23 of the '753 Patent does not produce discrete carbon nanotubes as seen through a scanning electron microscope.

8. I was asked by Dr. Clive Bosnyak, who is a named inventor of the '792 Patent Application, to compare the battery performance of carbon nanotube aggregates and the battery performance of discrete carbon nanotubes prepared by method of the instant '792 Patent Application.

9. I confirm that the attached Experiment 3 truly, accurately, and factually describes the comparative experiments relating to the battery performance of carbon nanotube aggregates and the battery performance of discrete carbon nanotubes prepared according to the instant invention. I confirm that as compared to those of non-individualized and non-discrete carbon nanotubes, individualized and discrete carbon nanotubes appeared to provide a higher level of homogeneity within the active material of a battery plate as seen through a scanning electron microscope. The beneficial effects of discrete individualized carbon nanotubes were thereby felt more uniformly throughout the battery system resulting in increased reserve capacity, increased conductivity, increased mechanical strength, and increased system efficiency.

10. I hereby declare that all statements made herein and in Experiments 1, 2, and 3 are of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

Nancy Henderson

Nancy Henderson, Ph.D.

Date: 12/1/14

EXPERIMENT 1

PURPOSE

Analysis of the carbon nanotubes as prepared by the method of Example 10 of U.S. Patent No. 7,070,753 ("Example 10 of the '753 Patent") and its comparison to the carbon nanotubes in lead paste of the instant invention of U.S. Patent Application Serial No. 13/529,792 ("the '792 Patent Application").

PROCEDURE

The procedures as outlined in Example 10 of the '753 Patent were followed but the quantities were proportionally scaled down to accommodate the available equipment. Details of the experiment as performed by Nancy Henderson were recorded in data book SN 2014-05-0001, pages 51-52.

A round bottom flask was placed in a water bath on a thermocouple controlled stirring hot plate. A stirrer bar was placed in the water bath and in the flask to insure uniform temperature and reaction agitation. A condenser with room temperature cooling water was attached to the flask to reduce evaporation. A thermocouple linked to the hot plate was inserted into one neck of the flask (Figure 1). To the flask, 30 grams of 30% aqueous solution of hydrogen peroxide, (Semiconductor Grade, UltraPure Solutions) were added. To this, 2.13 grams cotton candy ("CC") type carbon nanotubes ("CNT") (Flowtube 9000, CNano Technology) were slowly added. An additional 10 grams of hydrogen peroxide were added to wash down any carbon nanotubes clinging to the side of the flask. The total amount of hydrogen peroxide used was 40 grams. The starting temperature was 23.1 °C. The water bath was used to control the temperature of the reaction so that the temperature of the reaction was kept between 80 and 90 °C. The first sign of the reaction, indicated by bubbling, was detected within 5 minutes of addition of the carbon nanotubes. The reaction proceeded until the hydrogen peroxide was depleted as confirmed by a peroxide stick test. The time of reaction was two hours as measured from the first signs of reaction.

After 2 hours, the solution was cooled to room temperature. It was filtered and then washed with 5 volumes of reversed osmosis ("RO") water. The CNT were dried in a vacuum oven overnight.

Samples for scanning electron microscope ("SEM") were prepared by adding a small quantity of dried carbon nanotubes to isopropyl alcohol and sonicated for 15 seconds in a sonicating water bath. A drop was placed on a silicon wafer which was then attached to a SEM stube with graphite glue. Imaging was performed by Nancy Henderson using a Jeol JSM-6010LA scanning electron microscope. There treated tubes (Figure 3) were imaged and found to retain the CC appearance of the untreated tubes (Left Image of Figure 3). It appears that the procedure did not alter the morphology of the CNT and they remained entangled (Right Image of Figure 3). Even at high magnification, the treated tubes retained the CC appearance.

The discrete carbon nanotubes of the type used in the leads paste of the instant '792 Patent Application were prepared from the same CC CNT source (Flowtube 9000, CNano Technology). The carbon nanotubes were sonicated in a concentrated 65.5% nitric acid solution for a target of 20 kJ/g energy input at 75 °C for 5 hours. When compared to the CNT treated according to Example 10 of the '753 Patent, the distinction between discrete and aggregate is clearly seen (Figure 4).

CONCLUSION

The process as described in Example 10 of the '753 Patent, did not produce discrete carbon nanotube tubes as seen through a scanning electron microscope.

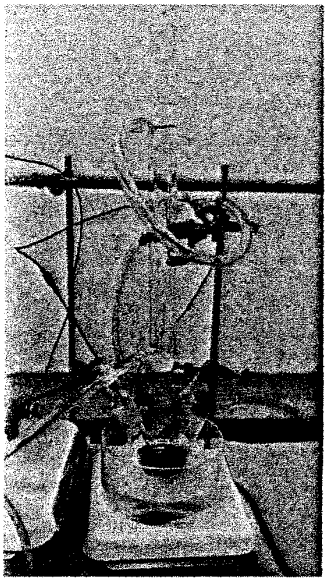


Figure 1
Experimental Setup

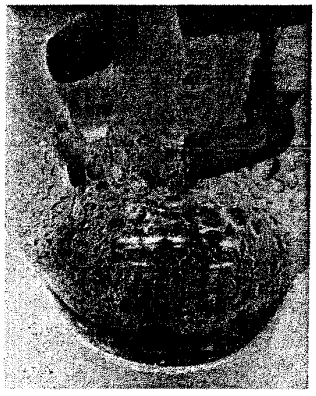


Figure 2
Signs or Reaction

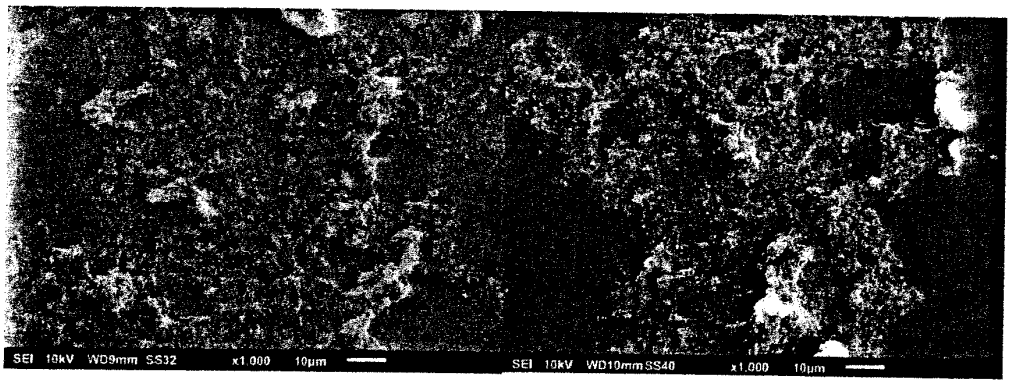


Figure 3
Left Image: Untreated CNT (Magnification 1000x)
Right Image: Treated CNT (Magnification 1000x)

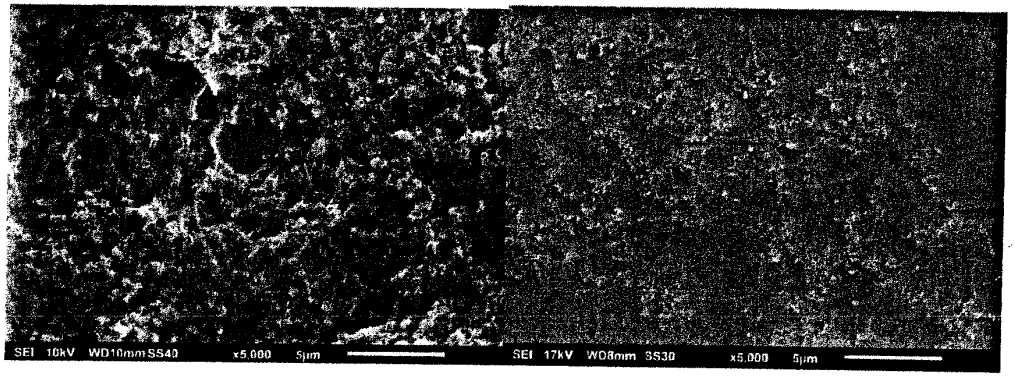


Figure 4
Left Image: CNT Treated per Example 10 of the '753 Patent (Magnification 5000x)
Right Image: Discrete CNT used in lead paste (Magnification 5000x)

EXPERIMENT 2

PURPOSE

Analysis of the carbon nanotubes as prepared by the method of Example 23 of U.S. Patent No. 7,070,753 ("Example 23 of the '753 Patent") and its comparison to the carbon nanotubes in lead paste of the instant invention of U. S. Patent Application Serial No. 13/529,792 ("the '792 Patent Application").

PROCEDURE

The procedures as outlined in Example 23 of the '753 Patent, were followed but the quantities were proportionally scaled down to accommodate the available equipment. Details of the experiment as performed by Nancy Henderson were recorded in data book SN 2014-05-0001, pages 49-50.

A round bottom flask was placed in a water bath on a thermocouple-controlled stirring hot plate. A stirrer bar was placed in the water bath and in the flask to insure uniform temperature and reaction agitation. A condenser sealed with a septum and vented via a small bore needle was attached to the flask to reduce evaporation. A thermocouple linked to the hot plate was inserted into one neck of the flask (Figure 1). To the flask, 30 grams of acetone (Semiconductor Grade, UltraPure Solutions) were added. 18.3 grams of cumene hydroperoxide (Sigma Aldrich) were slowly added while stirring. Once addition was complete, 0.36 grams of cotton candy ("CC") type carbon nanotubes ("CNT") (Flowtube 9000, CNano Technology) were slowly added. Bath was at 37 °C at the start. Temperature was monitored over a 2 hour period and held between 35° C and 40 °C (average = 37.5 °C). No appreciable loss of solvent was observed.

After 2 hours, the solution was cooled to room temperature. It was filtered and then washed with 5 volumes of reversed osmosis ("RO") water. The CNT were dried in a vacuum oven overnight.

Samples for scanning electron microscope ("SEM") were prepared by adding a small quantity of dried tubes to isopropyl alcohol and sonicated for 15 seconds in a sonicating water bath. A drop was placed on a silicon wafer which was then attached to a SEM stub with graphite glue. Imaging was performed by Nancy Henderson using a Jeol JSM-6010LA scanning electron

microscope. The treated tubes (Figure 2) were imaged and found to retain the CC appearance of the untreated tubes (Figure 3). It appears that the procedures did not alter the morphology of the CNT and the CNT remained entangled.

The discrete carbon nanotubes of the type used in the lead paste of the instant '792 Patent Application were prepared from the same CC CNT source (Flowtube 9000, CNano Technology). The carbon nanotubes were sonicated in a concentrated 65.5% nitric acid solution for a target of 20 kJ/g energy input at 75 °C for 5 hours. When compared to the CNT treated per Example 23 of the '753 Patent, the distinction between discrete and aggregate is clearly seen (Figure 3).

CONCLUSION

The process as described in Example 23 of the '753 Patent did not produce discrete carbon nanotubes as seen through a scanning electron microscope.

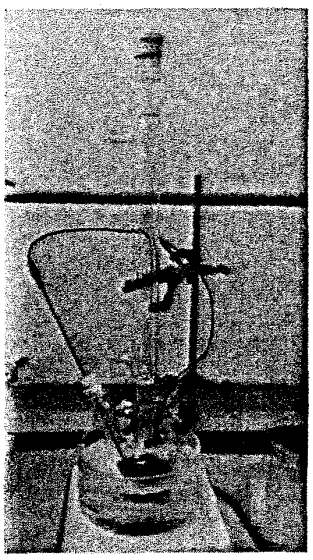


Figure 1
Experimental Setup

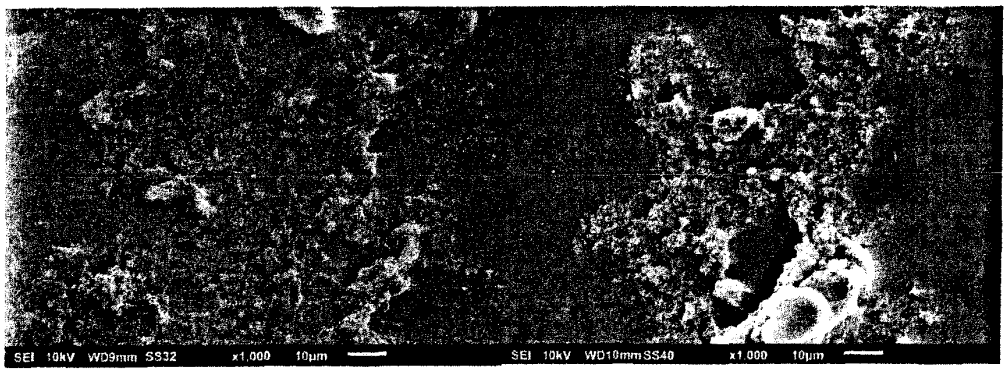


Figure 2
Left Image: Untreated CNT
Right Image: Treated CNT per Example 23 of the '753 Patent (Magnification 1000x)

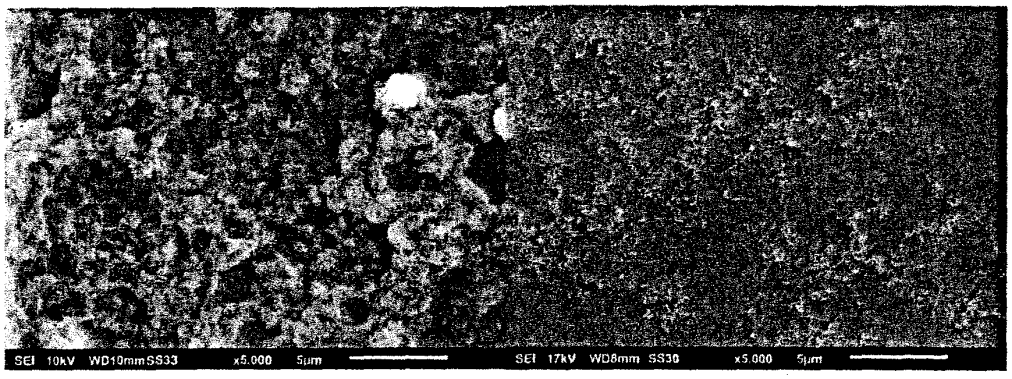


Figure 3
Left Image: CNT treated per Example 23 of the '753 Patent
Right Image: Discrete CNT used in lead paste (Magnification 5000x)

EXPERIMENT 3

Performance of Lead Acid Battery Paste with either Carbon Nanotube Aggregates or Discrete Carbon Nanotubes

PURPOSE

To compare the performance of a battery using carbon nanotubes aggregates in a lead paste with the performance of a battery using discrete carbon nanotubes in a lead paste (prepared according to the instant invention of U.S. Patent Application Serial No. 13/529,792 ("the '792 Patent Application")).

PROCEDURE

Molecular Rebar® Negative Paste Mixing Protocol

One kilogram of lead oxide (Power Labs, 25-35% Free Lead Content) were mixed with 0.7 g Modacrylic Flock (Associated Battery Products) and 6.1 g expander (Hammond, HEM-4640) using an Eirich EL-1 mixer for 2 minutes on low 500 revolution per minute ("RPM"). To this dry mix, 53.33 g of a 3% dispersion of discrete carbon nanotubes according to the instant invention of the '792 Patent Application were added followed by 64.07 g battery grade water (BS4974: 1975). The mixture was mixed for an additional 2 minutes on low RPM. Over the course of the next 15 minutes, 100.4 g of 1.3 sp.gr. sulfuric acid were added to the paste as it stirred, also at low RPM.

After this addition, the paste was complete and ready for Quality Control Tests and grid pasting. Using this recipe, the final weight percentage of discrete carbon nanotubes with respect to lead was 0.16%.

C9000 Negative Paste Mixing Protocol

One kilogram of lead oxide (Power Labs, 25-35% free lead content) were mixed with 0.7 g Modacrylic Flock (Associated Battery Products), 6.1 g expander (Hammond, HEM-4640), and 1.6 g carbon nanotube aggregates, C9000 (CNano Technology) using an Eirich EL-1 mixer for 2 minutes on low RPM. To this dry mix, 117.4 g battery grade water (BS4974: 1975) were added. The mixture was mixed for an additional 2 minutes at low RPM. Over the course of the next 15 minutes, 100.4 g of 1.3 sp.gr. sulfuric acid were added to the paste as it stirred, also at low RPM.

After this addition, the paste was complete and ready for quality control tests and grid pasting. Using this recipe, the final weight percentage of aggregate carbon nanotubes with respect to lead was 0.16%.

Quality Control Test Protocols

Paste density was measured by filling a pyncometer, or density measuring cup, to the brim with prepared paste. The top was then pressed on, with excess material exiting via a lid-mounted hole, and the whole assembly was weighed. The pyncometer had a volume of exactly 50 mL. The paste density was calculated by subtracting the filled pyncometer weight from the empty pyncometer weight and dividing by 50 to return the density in g/mL. Density should be about 4.2 ± 0.1 g/mL.

Paste penetration was measured by penetrometer. Prepared paste was placed into a bowl and the penetrometer was dropped into it. The distance that the penetrometer tip moved into the material was measured. Penetration should be about 60 ± 5 mm.

Gross paste rheology was measured by dropping 100 g of completed paste from a height of 1 m onto a sheet of 1 cm^2 grids. The amount of squares covered by the dropped paste returned the 'splatter area' a measurement of the paste consistency. Splatter area should be about 24 cm^2.

Grid Pasting, Curing and Drying Protocols

To prepare the battery grid, 63.1 g of paste were pushed and rolled into NS40 automotive battery grids. These pasted grids were placed in heated chamber at 45 °C, with a 95% humidity, 45 °C for 32 h to cure. After curing, the free lead content in the cured plates dropped below 5%, and the grids were moved to a 100 °C drying chamber. Duplicate grid material was reserved for SEM analysis.

Electrical Tests

Cured, dried negative plates undergo formation in 3D printed battery cells containing 1 negative plate and 1 positive plate submerged in 1.04 sp.gr. sulfuric acid. The negative plates were the test plates containing either the untreated C9000 or the discrete carbon nanotubes. These plates were connected to a battery charging unit (Arbin Instruments, BT-G-10A-5V-32)

and subjected to a 1.6 A constant current charge for 15 h. Various data metrics including voltage and current were measured.

Reserve capacity tests began with a 20 h, 2.46 V constant voltage boost charge followed by a 4 h rest period, and a 5 A constant current discharge until the battery voltage fell below 1.75 V. The length of time that the battery discharges until reaching 1.75 V and/or the capacity (A·h) was the reserve capacity parameter. This test was repeated several times to monitor the ability of the battery to endure cycling.

Results

The paste parameters (Table 1) indicated no significant change in density between control and the paste with discrete carbon nanotubes. The penetration depth between the control and the discrete carbon nanotubes were within the error but the C9000 penetration depth was shallower. The rheological properties of the paste containing the discrete carbon nanotubes matched those of the control but the paste with C9000 was significantly different. This difference would lead to difficulty in pasting the grids.

Table 1. Paste Properties

	Control Negative Paste (n = 3)	Discrete Carbon Nanotubes Negative Paste (n = 5)	C9000 Negative Paste (n = 2)
Density (g/mL)	4.49 ± 0.05	4.41 ± 0.08	4.39 ± 0.01
Penetration (mm)	74 ± 7.4	60.5 ± 4.36	45 ± 1.0
Splatter Area (cm^2)	21.3 ± 0.88	20.0 ± 4.3	12.5 ± 0.5

The ability of a battery to maintain the same capacity over a number of cycles is a much desired performance metric translating to increased cycle life, better overall battery health, and an improved battery system. In Figure 1, it showed that there was a steep decline in the capacity of the battery with CC Type carbon nanotubes while the battery containing discrete carbon nanotubes retained a significant portion of the capacity with each cycle.

Samples for scanning electron microscope ("SEM") were prepared by attaching a portion a plate to an SEM stub with carbon tape. The fragment was placed on the stub so as to expose the fracture surface. Imaging was performed with a Jeol JSM-6010LA scanning electron

microscope. Images were taken to assess the overall crystal structure of the cured plate, locate carbon nanotubes and determine the degree of dispersion.

The plate specimen containing the C9000, showed signs of localized concentration of carbon nanotubes (Figure 2). Even the best dispersion found was of a large clump (Figure 3).

Plates containing discrete carbon nanotubes showed uniform crystals with no localized carbon nanotubes (Figure 4). Upon closer inspection, the carbon nanotubes were found to be individualized and discrete in the paste (Figure 5).

CONCLUSION

As compared to the non-individualized and non-discrete carbon nanotubes, individualized and discrete carbon nanotubes appeared to provide a higher level of homogeneity within the active material of a battery plate as seen through a scanning electron microscope. The beneficial effects of discrete individualized carbon nanotubes were thereby felt more uniformly throughout the battery system resulting in increased reserve capacity, increased conductivity, increased mechanical strength, and increased system efficiency. Here, this performance boost was represented by a change in the capacitive performance of small, 2 V cells.

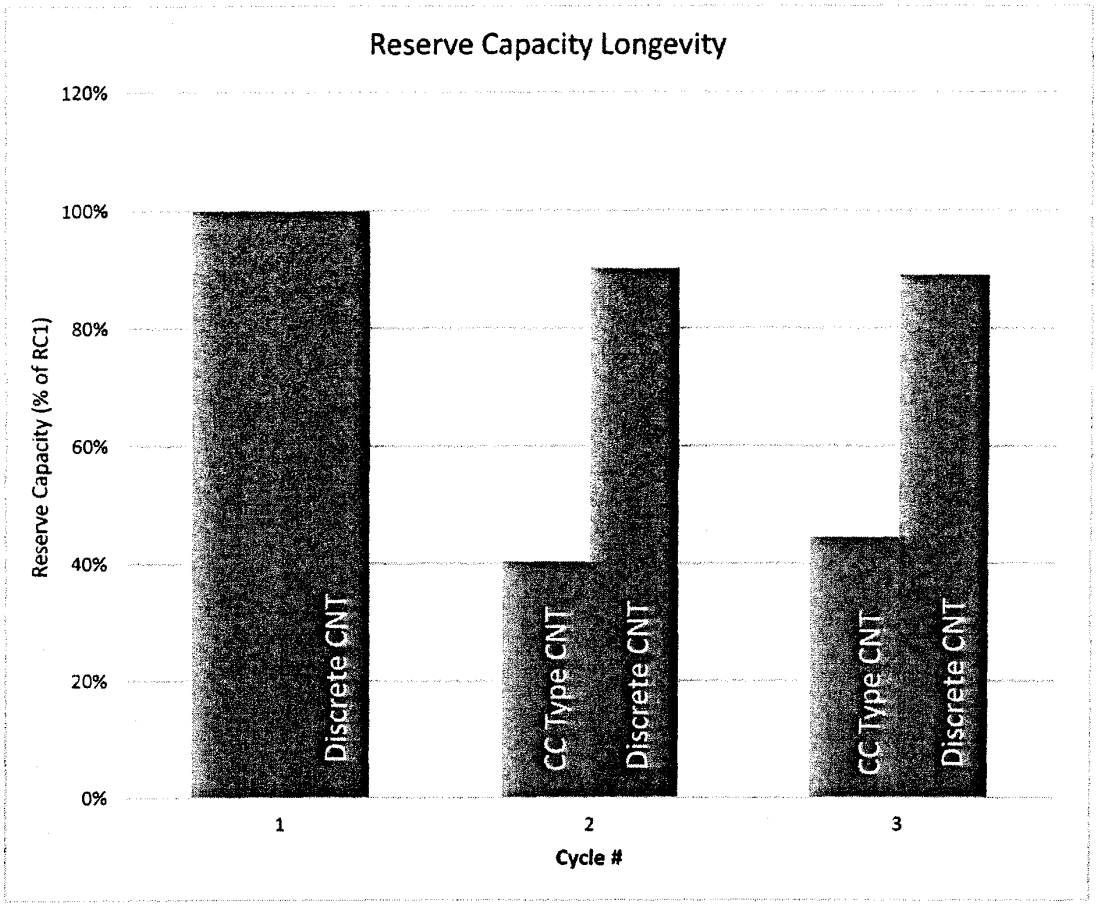


Figure 1
Reserve Capacity

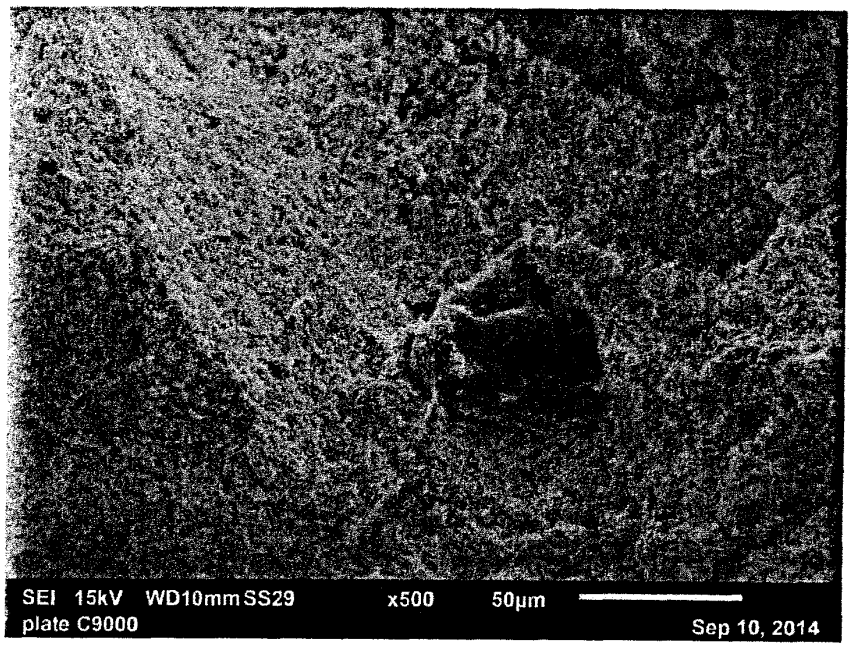


Figure 2
Plate with C9000 (Magnification 500x)

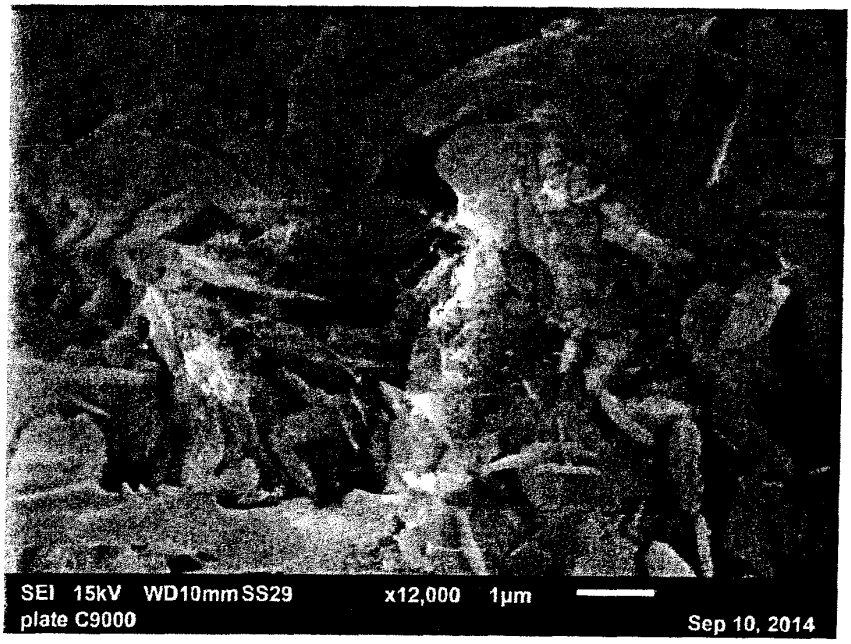


Figure 3
Clump of C9000 in between lead crystals (Magnification 12000x)

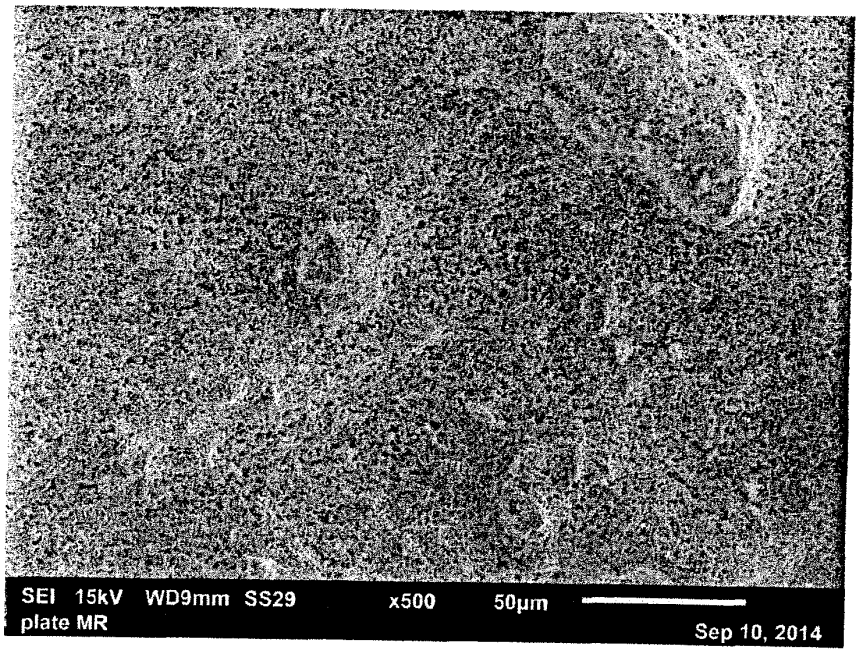


Figure 4
Discrete Carbon Nanotubes in Lead Paste (Magnification 500x)

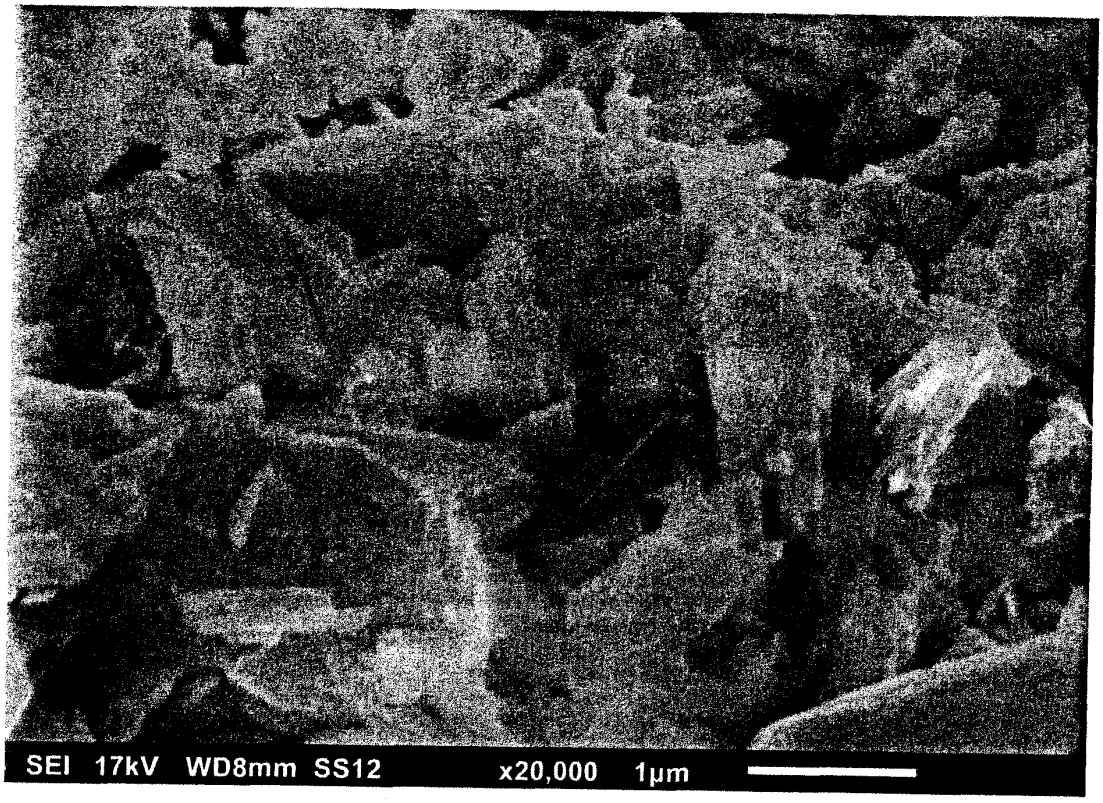


Figure 5
Discrete Carbon Nanotubes (Magnification 20,000x)

PTO/AIA/31 (03-14)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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NOTICE OF APPEAL FROM THE EXAMINER TO THE PATENT TRIAL AND APPEAL BOARD

Docket Number (Optional): DENA-0008US (223156)

I hereby certify that this correspondence is being facsimile transmitted to the USPTO, EFS-Web transmitted to the USPTO, or deposited with the United States Postal Service with sufficient postage in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, on Alexandria, VA 22313-1450" [37 CFR 1.8(a)]

on _____.

Signature _____

Typed or printed name _____

In re Application of: Clive P. Bosnyak

Application Number	Filed
13/529,797	June 21, 2012

For: Lithium Ion Batteries Using Discrete Carbon Nanotubes...

Art Unit	Examiner
1723	Philip A. Stuckey

Applicant hereby **appeals** to the Patent Trial and Appeal Board from the last decision of the examiner.

The fee for this Notice of Appeal is (37 CFR 41.20(b)(1)) $ 400.00

☑ Applicant asserts small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by 50%, and the resulting fee is: $ 200.00

☐ Applicant certifies micro entity status. See 37 CFR 1.29. Therefore, the fee shown above is reduced by 75%, and the resulting fee is: $ _____
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 500897.

☑ Payment made via EFS-Web.

☑ A petition for an extension of time under 37 CFR 1.136(a) (PTO/AIA/22 or equivalent) is enclosed.
For extensions of time in reexamination proceedings, see 37 CFR 1.550.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant

☑ attorney or agent of record
Registration number 40131

☐ attorney or agent acting under 37 CFR 1.34
Registration number _____

Signature /Gregory L. Porter/

Typed or printed name Gregory L. Porrter

Telephone Number 713.220.4621

Date 2015-09-24

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☑ * Total of 1 forms are submitted.

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Privacy Act Statement

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	13529797
Filing Date:	21-Jun-2012
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Filer:	Gregory L. Porter/Anne Sullivan (paralegal)
Attorney Docket Number:	DENA-0008 (137124.00041)

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Notice of Appeal	2401	1	400	400
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Extension - 3 months with $0 paid	2253	1	700	700
Miscellaneous:				
		Total in USD ($)		**1100**

Electronic Acknowledgement Receipt	
EFS ID:	23595060
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	117364
Filer:	Gregory L. Porter/Anne Sullivan (paralegal)
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (137124.00041)
Receipt Date:	24-SEP-2015
Filing Date:	21-JUN-2012
Time Stamp:	16:16:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1100
RAM confirmation Number	3999
Deposit Account	500897
Authorized User	PORTER, GREGORY L.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	After Final Consideration Program Request	MRE008NP_AfterFinalRequest_sb0434.PDF	226833 4380bc974d4bbc8b7c8b771126891ca34790b28d	no	2
Warnings:					
Information:					
2	Response After Final Action	MRE008NP_ResponsetoFinal.PDF	1329906 950ef4055769e02e67a8eb16e129b1bb376a5421	no	28
Warnings:					
Information:					
3	Notice of Appeal Filed	MRE008NP_NoticeofAppeal.PDF	237222 8e6b5a0bfe634c07e84c17780108086f3001d1f6	no	2
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	32672 48c0bfd945d477134860ddf221e0acb4e0a34c13	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1826633		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
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PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/529,797	Filing Date 06/21/2012	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	09/24/2015	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 21	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***6	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/TYWANA LOVELACE/

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Doc Code: PA..
Document Description: Power of Attorney

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NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	13/529,797
Filing Date	2012-06-21
First Named Inventor	Clive P. Bosnyak
Title	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
Art Unit	1723
Examiner Name	Philip A. Stuckey
Attorney Docket Number	DENA-0008 (223156)

SIGNATURE of Applicant or Patent Practitioner

Signature	/Gregory L. Porter/	Date (Optional)	2015-09-22
Name	Gregory L. Porter	Registration Number	40131
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)	Molecular Rebar Design, LLC		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

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I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

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☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 130577

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

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☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Molecular Rebar Design, LLC

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	/S. P. Krupp/	Date (Optional)	03-16-2015
Name	Stephen P. Krupp		
Title	Chief Patent Counsel, Molecular Rebar Design, LLC		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ Total of 1 forms are submitted.

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POWER OF ATTORNEY BY APPLICANT

No more than ten (10) patent practitioners total may be appointed as set forth below by name and registration number. This page need not be submitted if appointing the Patent Practitioner(s) associated with a Customer Number (see form PTO/AIA/82B):

Name	Registration Number

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/96 (07-09)
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Molecular Rebar Design, LLC

Application No./Patent No.: 13/529,797 Filed/Issue Date: 06/21/2012

Titled: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

Molecular Rebar Design, LLC (Name of Assignee), a corporation (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made) the patent application/patent identified above, by virtue of either:

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Clive P. Bosnyak & Kurt W. Swogger To: Designed Nanotubes, LLC
   The document was recorded in the United States Patent and Trademark Office at
   Reel 028537, Frame 0779, or for which a copy thereof is attached.

2. From: Designed Nanotubes, LLC To: Swogger P.I.I., LLC
   The document was recorded in the United States Patent and Trademark Office at
   Reel 030393, Frame 0978, or for which a copy thereof is attached.

3. From: Swogger P.I.I., LLC To: Molecular Rebar Design, LLC
   The document was recorded in the United States Patent and Trademark Office at
   Reel 030436, Frame 0836, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Gregory L. Porter/ — Signature
03/19/2015 — Date
Gregory L. Porter — Printed or Typed Name
Attorney of Record — Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	23567031
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	117364
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (137124.00041)
Receipt Date:	22-SEP-2015
Filing Date:	21-JUN-2012
Time Stamp:	14:44:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		RevisedPOA_373Stmt.pdf	436569 8dbce23d5e91c5702c89737fcca6ef133addece2	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Power of Attorney	1	4
	Assignee showing of ownership per 37 CFR 3.73	5	5
Warnings:			
Information:			
	Total Files Size (in bytes):	436569	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (137124.00041)

CONFIRMATION NO. 1004

117364
Molecular Rebar Design, LLC
Jackson Walker L.L.P.
901 Main Street, Suite 6000
Dallas, TX 75202

MISCELLANEOUS NOTICE

OC000000074214516

Date Mailed: 03/25/2015

A communication which cannot be delivered in electronic form has been mailed to the applicant.

Doc Code: N572

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APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (137124.00041)

CONFIRMATION NO. 1004

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HOUSTON, TX 77002

Date Mailed: 03/25/2015

DENIAL OF REQUEST FOR POWER OF ATTORNEY

The request for Power of Attorney filed **03/19/2015** is acknowledged. However, the request cannot be granted at this time for the reason stated below.

- ☐ The Power of Attorney you provided did not comply with the new Power of Attorney rules that became effective on June 25, 2004. See 37 CFR 1.32.
- ☒ The revocation is not signed by the applicant, the assignee of the entire interest, or one particular principal attorney having the authority to revoke.
- ☐ The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73(c) has not been received.
- ☐ The person signing for the assignee has omitted their empowerment to sign on behalf of the assignee.
- ☐ The inventor(s) is without authority to appoint attorneys since the assignee has intervened as provided by 37 CFR 3.71.
- ☐ The signature(s) of _____, a co-inventor in this application, has been omitted. The Power of Attorney will be entered upon receipt of confirmation signed by said co-inventor(s).
- ☐ The person(s) appointed in the Power of Attorney is not registered to practice before the U.S. Patent and Trademark Office.
- ☐ Only one Customer Number can be designated for the Power of Attorney in an application. The Customer Number that was captured is the first Customer Number provided on the Power of Attorney document.

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- ☐ A request under 37 CFR 1.48 to add an inventor was granted in this application, however, no power of attorney consistent with the power of attorney granted by the originally named inventive entity has been received. Thus, the addition of the inventor has resulted in the loss of power of attorney in the application. See 37 CFR 1.32(e).

- ☐ The power of attorney has not been accepted because the party who is giving power of attorney has not been identified. Power of attorney may only be signed by the applicant for patent (37 CFR 1.42) or the patent owner. A patent owner who was not the applicant must appoint any power of attorney in compliance with 37 CFR 3.71 and 3.73. See 37 CFR 1.32(b)(4).

- ☐ The power of attorney from the inventors has not been accepted because it is a copy from a prior national application for which benefit is claimed and the continuing application names an inventor who was not named as an inventor in the prior application.

- ☐ The power of attorney from the inventors has not been accepted because the power of attorney must be signed by the applicant for patent. See 37 CFR 1.32(b)(4).

- ☐ Any request to correct or update the name of the applicant must include an application data sheet (ADS) in compliance with 37 CFR 1.76 specifying the correct or updated name of the applicant in the applicant information section. Any request to change the applicant after an original applicant has been specified under 37 CFR 1.46(b) must include a new ADS in compliance with 37 CFR 1.76 specifying the applicant in the applicant information section and comply with 37 CFR 3.71 and 3.73. See 37 CFR 1.46(c).

Any inquiries regarding this notice should be directed to the Application Assistance Unit at 571-272-4200.

Application Assistance Unit
571-272-4200

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (137124.00041)	1004

117364 7590 03/24/2015

Molecular Rebar Design, LLC
Jackson Walker L.L.P.
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EXAMINER	
STUCKEY, PHILIP A	

ART UNIT	PAPER NUMBER
1723	

MAIL DATE	DELIVERY MODE
03/24/2015	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 13/529,797	Applicant(s) BOSNYAK ET AL.	
	Examiner Philip A. Stuckey, PhD	Art Unit 1723	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2015*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-21* is/are pending in the application.

5a) Of the above claim(s) *8 and 9* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-7 and 10-21* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

The present application is being examined under the pre-AIA first to invent provisions. Claims 1-21 are pending; claims 8-9 are withdrawn. Claims 1, 8, 9, 10, 11, and 12 are independent.

The applicant's amendment necessitated the new grounds of rejection presented in this office action.

The double patenting rejection over 14/128,392 application is withdrawn.

The rejections under 35 USC 112 are withdrawn.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Priority

The examiner does not find support for the instant claim amendments in provisional application 61/500,560 and accordingly, the claims are not entitled to the benefit date of the provisional application but rather toward the filing date of the instant application on 21 June 2012.

Specification

The disclosure is objected to because of the following informalities: graphene is misspelled in [0009]. The burden is shifted to the applicant to review the specification for other minor errors.

Appropriate correction is required.

Claim Objections

Claim 7 is objected to because of the following informalities: Graphene is misspelled. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 11-15, 18-21 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Li et al., *A novel network composite cathode of LiFePO4/multiwalled carbon nanotubes with high rate capability for lithium ion batteries*, Electrochemistry Communications, Volume 9, Issue 4, April 2007, Pages 663-666, herein referred to as "Li 2006".

As to **claim 1**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, See e.g. Section

4. Conclusions. Li 2006 further teaches discrete and exfoliated carbon nanotubes (MWCNTs, see figure 2, which are considered discrete and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials with e.g. lithium migratable ions, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 is a point which falls within the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1 and thus anticipates the claimed range. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2.

As to **claims 2 and 3**, Li 2006 teaches $LiFePO_4$ which is a lithium metal salt having and element selected from the group consisting of iron, having an olivine crystal structure, and the lithium metal salt is $LiFePO_4$.

As to **claim 4**, Li 2006 teaches the loading of the $LiFePO_4$ on Al foil, see see page 664 second column second paragraph) which teaches the layers of lithium ion active material comprise aluminum as instantly claimed.

As to **claim 11**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, See e.g. Section 4. Conclusions. Li 2006 further teaches discrete and exfoliated carbon

nanotubes (MWCNTs, see figure 2, which are considered discrete and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials with e.g. lithium migratable ions, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 is a point which falls within the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1 and thus anticipates the claimed range. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface and wherein the carbon nanotubes are uniformly dispersed without clustering on a dimension scale of less than about 1 micrometer, see figures 2a and 2b which shows the MWCNTs on a dimension scale of 1 micron in 2a being uniformly dispersed without clustering.

As to **claim 12**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, See e.g. Section 4. Conclusions. Li 2006 further teaches oxidized carbon nanotubes (MWCNTs, see figure 2 and the first paragraph of the Experimental section on page 664), which are considered oxidized because they are washed to nitric).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials with

e.g. lithium migratable ions, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 is an anticipatory point which falls within the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2.

As to **claim 13**, Li 2006 teaches the discrete carbon nanotubes having layers of lithium ion active material are attached to their surface, see figure 2.

Li 2006 teaches the product as instantly claimed. The limitation regarding chemical attachment does not impart additional structural or chemical limitations that distinguish the instant claims from that of the prior art.

Furthermore, it is inherent that Van der Waals forces exist between the materials of Li 2006 which teaches chemical attachment as instantly claimed.

As to **claims 14 and 15**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1 which anticipates the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

As to **claims 18 and 19**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of

18:1 which anticipates the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

As to **claims 20 and 21**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1 which anticipates the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

Claim Rejections - 35 USC § 103

Claim 5 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Li 2006 in view of Niu et al., US 7,070,753 B2, herein referred to as Niu '753.

As to **claim 5**, Li 2006 teaches the composition of claim 1.

Li 2006 is silent regarding the precise aspect ratio and oxidation level of the carbon nanotubes.

However, Niu '753 teaches disassembled (disentangled) discrete carbon nanotubes that have an oxygen content of 3.8% (column 6, lines 41-44, Table 5), which is considered the oxidation level. Niu '753 further teaches nanotubes include those having a length to diameter ratio of greater than 5 (column 8, lines 34-40). This teaching of Niu teaches an aspect ratio of 5 or greater which establishes a prima facie case of obviousness as it encompasses the claimed range. See MPEP 2144.05 regarding the Obviousness of Ranges.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use disassembled discrete carbon nanotubes with increased

oxygen content in the invention of Li 2006 because Niu discloses that an increase in oxygen content can also improve density of the material (column 14, lines 66-67). It also would have been obvious to one of ordinary skill in the art at the time of the invention to use the aspect ratio as taught by Niu for the carbon nanotubes of Li 2006 because one would want a sufficient aspect ratio for binding to the materials in the electrode. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Claims 6 and 7 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Li 2006 in view Zhamu et al., US 2010/0176337 A1, herein referred to as Zhamu '337.

As to **claims 6 and 7**, Li 2006 teaches the composition of claim 1.

Li 2006 is silent regarding the composition further comprising graphene or oxygenated graphene and wherein the weight ratio of grapheme to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

Zhamu '337 teaches graphene reinforced composite electrode for lithium ion batteries (see e.g. title and abstract). Zhamu '337 further teaches that the graphene platelets occupy a weight fraction of 2% to 50% of the total nanocomposite weight (see [0089]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the graphene weight fraction as taught by Zhamu '337 in the the

nanocomposite mixture of Li 2006 because Zhamu '337 teaches that the graphene reinforces the electrode.

Claims 10 and 16-17 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Li 2006.

As to **claim 10**, Li 2006 teaches a novel composite cathode material of lithium iron phosphate and multi-walled carbon nanotubes for a lithium ion battery, See e.g. Section 4. Conclusions. Li 2006 further teaches discrete and exfoliated carbon nanotubes (MWCNTs, see figure 2, which are considered discrete and exfoliated as instantly claimed because they are dispersed in the composite cathode slurry mixture).

Li 2006 further teaches mixtures of ion active materials comprising migratable ions (the mixture of $LiFePO_4$: PVDF: MWCNTs is a mixture of ion active materials with e.g. lithium migratable ions, see page 664 second column second paragraph). Li 2006 further teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1. Li 2006's ratio of 18:1 teaches the claimed range of a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1. See MPEP 2131.03 regarding the Anticipation of Ranges.

Li 2006 further teaches the discrete carbon nanotubes having layers of lithium ion active material attached to their surface, see figure 2.

Li 2006 teaches the cell contains 1 molar $LiPF_6$, which is a lithium salt, in the electrolyte (see page 664 second column second paragraph) which penetrates the positive electrode to provide an ionic pathway within the electrochemical cell. Li 2006

further teaches that the ratio of the carbon nanotubes in the cathode is in a weight ratio of 5% to the total cathode slurry weight and that the cathode is dissolved in NMP solvent (see page 664 second column second paragraph). It is readily seen from this teaching that the weight ratio of carbon nanotubes is low in comparison to the total weight of the cathode active material. Li 2006 does not expressly disclose the weight ratio of the carbon nanotubes to the the weight ratio of the lithium salts, but rather Li 2006 teaches the concentration of lithium salts to carbon nanotubes and that this ratio is relatively low in comparison thus establishing a prima facie case of obviousness regarding the claimed ranges for a weight ratio of carbon nanotubes to lithium salts of 0.1% to 10%. See MPEP 2144.05 regarding the Obviousness of Ranges.

It is well known that one desires a low solution resistance to prevent losses. Furthermore, one of ordinary skill in the art would be able to determine through routine experimentation the optimal weight ratio of carbon nanotubes to lithium salts and could arrive at 0.1% to 10% to decrease the solution resistance of a lithium ion battery. Furthermore, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

As to **claims 16 and 17**, Li 2006 teaches the mixture is in a weight ratio of 90:5:5 and thus the lithium ion to other total ions ratio is 90:5 which is a normalized ratio of 18:1 which teaches the claimed ranges of the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1 and 10:1 to 25:1.

Response to Arguments

Applicant's arguments filed 13 January 2015 have been fully considered but they are not persuasive. Furthermore, the applicant's arguments with respect to the instant claims have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the structure of the discrete and exfoliated carbon nanotubes, as argued by the applicant on page 7 last paragraph of the remarks has relied on features as discussed in the remarks and in [0024] of the instant specification) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Maxim N. Tchoul,†, Warren T. Ford,*,†, Giulio Lolli,‡, Daniel E. Resasco,‡ and, and Sivaram Arepalli, *Effect of Mild Nitric Acid Oxidation on Dispersability, Size, and Structure of Single-Walled Carbon Nanotubes,* Chemistry of Materials 2007 19 (23), 5765-5772, teaches that the oxidation of single-walled carbon nanotubes (SWNTs) with

nitric acid increases their dispersability in water, methanol, and N,N-dimethylformamide, see e.g. abstract.

Bo Jin, En Mei Jin, Kyung-Hee Park, Hal-Bon Gu, *Electrochemical properties of $LiFePO_4$-multiwalled carbon nanotubes composite cathode materials for lithium polymer battery*, Electrochemistry Communications, Volume 10, Issue 10, October 2008, Pages 1537-1540, teaches a composite material relevant to the claimed invention.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip A. Stuckey, PhD whose telephone number is (571)272-9875. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on (571)272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Philip A. Stuckey, PhD/
Examiner, Art Unit 1723

/MILTON I CANO/
Supervisory Patent Examiner
Art Unit 1723

Notice of References Cited	Application/Control No. 13/529,797	Applicant(s)/Patent Under Reexamination BOSNYAK ET AL.	
	Examiner Philip A. Stuckey, PhD	Art Unit 1723	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,070,753 B2	07-2006	Niu et al.	423/447.1
*	B	US-2010/0176337 A1	07-2010	Zhamu et al.	252/182.1
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Xinlu Li, Feiyu Kang, Xinde Bai, Wanci Shen, A novel network composite cathode of LiFePO4/multiwalled carbon nanotubes with high rate capability for lithium ion batteries, Electrochemistry Communications, Volume 9, Issue 4, April 2007, Pages 663-666.
	V	Bo Jin, En Mei Jin, Kyung-Hee Park, Hal-Bon Gu, Electrochemical properties of LiFePO4-multiwalled carbon nanotubes composite cathode materials for lithium polymer battery, Electrochemistry Communications, Volume 10, Issue 10, October 2008, Pages 1537-1540.
	W	Effect of Mild Nitric Acid Oxidation on Dispersability, Size, and Structure of Single-Walled Carbon Nanotubes Maxim N. Tchoul, Warren T. Ford, Giulio Lolli, Daniel E. Resasco, and, and Sivaram Arepalli Chemistry of Materials 2007 19 (23), 5765-5772
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13529797	BOSNYAK ET AL.
	Examiner	Art Unit
	ERIC CONNELLY	1723

CPC- SEARCHED		
Symbol	Date	Examiner
H01M 4/587	07/09/2014	EMC
H01M 4/525 4/505	11 March 2015	PS

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
429	231.8	06/24/2014	EMC

SEARCH NOTES		
Search Notes	Date	Examiner
429 Consultation with Nicholas D'Aniello	06/24/2014	EMC
429 Consultation with Brian Talbot	07/09/2014	EMC
Inventor Search in PALM	06/24/2014	EMC
Assignee Search in EAST	06/24/2014	EMC
Application 14/128392 History and Search Reviewed	06/24/2014	EMC
EAST Keyword Search	06/24/2014	EMC
Inventor search in PALM	11 March 15	PS
EAST search History Report	11 March 15	PS
Consulted Milton Cano, Final	11 March 15	PS
NPL Google search: lithium ion battery solvent additives carbon nanotube LiFePO4	11 March 15	PS
Consulted Nick D'Aneillo	12 March 15	PS

INTERFERENCE SEARCH

/PHILIP A STUCKEY/ Examiner.Art Unit 1723	

US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/PHILIP A STUCKEY/ Examiner.Art Unit 1723	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"20120328946".pn.	US-PGPUB; USPAT	OR	ON	2015/03/04 19:50
S2	18107	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S3	16328	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S4	12562	S2 and S3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:53
S5	371	S4 and carbon near4 nanotube	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:56
S6	43	S5 and ratio with lithium with ion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/04 19:56
S7	7	("20110104551" | "20110311876" | "20110311876" | "20100159331").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 11:39
S8	3	("20110104551" | "20110311876" | "20110311876" | "20100159331").PN.	US-PGPUB; USPAT	OR	ON	2015/03/11 11:39
S9	18138	H01M4/525.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S10	16364	H01M4/505.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S11	12592	S9 and S10	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2015/03/11 15:35

			DERWENT; IBM_TDB			
S12	21	S11 and carbon near4 nanotube with (weight "wt" "wt%" "wt %")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:35
S13	6	S12 and ratio with lithium with ion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 15:36
S14	9	S12 and carbon near4 nanotube with (weight "wt" "wt%" "wt %") and aspect near3 ratio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 20:43
S15	6	S12 and carbon near4 nanotube with (weight "wt" "wt%" "wt %") and aspect near3 ratio and graphene	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 20:43
S16	22	carbon near4 nanotube with oxidation near2 level	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:19
S17	5	S11 and S16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:19
S18	17	S16 not S17	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:20
S19	11	S11 and carbon near4 nanotube with function$7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:22
S20	15	S11 and carbon near4 nanotube same function$7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:23
S21	4	S20 not S19	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:23
S22	464164	H01M$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:24
S23	632	S22 and carbon near4 nanotube with function$7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2015/03/11 21:24

			DERWENT; IBM_TDB			
S24	35	carbon near4 nanotube same oxidation near2 level	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:25
S25	18	S22 and S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:25
S26	5	S11 and S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 21:26
S30	1	"7070753".pn.	US-PGPUB; USPAT	OR	ON	2015/03/11 21:33
S31	5	S12 and carbon near4 nanotube with lithium near5 salt	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:35
S32	35	S22 and carbon near4 nanotube with lithium near5 salt	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:36
S33	6	S22 and carbon near4 nanotube with lithium near5 salt with weight	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:36
S34	29	S22 and carbon near4 nanotube same lithium near5 salt same (weight ratio)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:39
S35	5	S12 and carbon near4 nanotube same lithium near5 salt same (weight ratio)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/03/11 22:39

EAST Search History (Interference)

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3/ 12/ 2015 1:17:21 PM
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PTO/SB/81 (01-09)
Approved for use through 11/30/2011. OMB 0651-0035
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POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	13529797
Filing Date	2012-06-21
First Named Inventor	Clive P. Bosnyak
Title	Lithium Ion Batteries Using Discrete...
Art Unit	1723
Examiner Name	Milton I. Cano
Attorney Docket Number	DENA-0008 (223156)

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

130577

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified application to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the:

☐ Applicant/Inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Applicant or Assignee of Record

Signature		Date	3.19.2015
Name	Stephen P. Krupp	Telephone	979.292.4318
Title and Company	Chief Patent Counsel, Molecular Rebar Design, LLC		

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/96 (07-09)
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Molecular Rebar Design, LLC

Application No./Patent No.: 13/529,797 Filed/Issue Date: 06/21/2012

Titled: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

Molecular Rebar Design, LLC (Name of Assignee), a corporation (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

B. [X] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Clive P. Bosnyak & Kurt W. Swogger To: Designed Nanotubes, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 028537, Frame 0779, or for which a copy thereof is attached.

2. From: Designed Nanotubes, LLC To: Swogger P.I.I., LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 030393, Frame 0978, or for which a copy thereof is attached.

3. From: Swogger P.I.I., LLC To: Molecular Rebar Design, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 030436, Frame 0836, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[X] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Gregory L. Porter/	03/19/2015
Signature	Date
Gregory L. Porter	Attorney of Record
Printed or Typed Name	Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	21824988
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	117364
Filer:	Gregory L. Porter/Jeanne Dunn
Filer Authorized By:	Gregory L. Porter
Attorney Docket Number:	DENA-0008 (137124.00041)
Receipt Date:	19-MAR-2015
Filing Date:	21-JUN-2012
Time Stamp:	16:58:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		223156.pdf	435373 fb28099f2b0b51528d4ad94c6af6d11255ef80fa	yes	2

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Power of Attorney	1	1
	Assignee showing of ownership per 37 CFR 3.73.	2	2
Warnings:			
Information:			
	Total Files Size (in bytes):	435373	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Clive P. Bosnyak, *et al.*

Serial No.: 13/529,797

Filed: June 21, 2012

Art Unit: 1726

Examiner: Eric M. Connelly

Conf. No.: 1004

For: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

RESPONSE TO OFFICE ACTION

In response to the communication from the Examiner dated July 15, 2014, having a deadline for response expiring January 15, 2015, extended for three months by petition enclosed herewith, Applicants hereby amend the application as follows and submit the following remarks.

Amendments to the Claims are reflected in the listing of claims that begin on page 2 of this paper.

Remarks begin on page 5 of this paper.

Conclusion begins on page 11 of this paper.

IN THE CLAIMS:

1. (Currently Amended) A composition useful for lithium ion batteries comprising:
discrete and exfoliated carbon nanotubes, and mixtures of ion active materials comprising migratable ions, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes ~~having~~ have crystals or layers of lithium ion active material attached to their surface.

2. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise a lithium metal salt and an element selected from the group consisting of: iron, manganese, cobalt, copper, nickel, vanadium, titanium, and mixtures thereof.

3. (Currently Amended) The composition of claim 2, wherein the lithium metal salt has an olivine crystal structure and wherein the lithium metal salt is $LiFePO_4$ or $LiMnPO_4$.

4. (Original) The composition of claim 1, wherein the crystals or layers of lithium ion active material comprise tin, silicon, copper, antimony, aluminum, germanium, titanium, or mixtures thereof.

5. (Original) The composition of claim 1, wherein the discrete carbon nanotubes have an aspect ratio of 10 to 500 and oxidation levels from 1% to 15% by weight of the carbon nanotube.

6. (Original) The composition of claim 1, further comprising graphene or oxygenated graphene.

7. (Original) The composition of claim 6, wherein the weight ratio of grapheme to carbon nanotube is in the range of 0.1:99.9 to 99.9:0.1.

8. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

   a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level 1% to 15% percent by weight;

   b) mixing the carbon nanotubes with a high boiling point liquid;

   c) adding reagents in correct balance to synthesize a lithium salt;

   d) reacting the mixture at a temperature to form the lithium salt while sonicating the

mixture;

e) separating the solid discrete carbon nanotube salts from the liquid; and

f) drying and annealing the solid discrete carbon nanotube salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

9. (Withdrawn) A process for the production of the discrete carbon nanotubes having crystals or layers of lithium ion active materials attached to their surface, comprising the steps of:

a) selecting carbon nanotubes of aspect ratio 10 to 500 and oxidation level of 1% to 15% by weight;

b) mixing the carbon nanotubes and a lithium salt in a liquid with surfactant;

c) sonicating the liquid carbon nanotube/lithium salt mixture;

d) separating the solid salts from the liquid; and

e) drying and annealing the solid discrete carbon nanotubes with attached lithium salts under an inert atmosphere at sufficient temperature to obtain an olivine crystal structure.

10. (Currently Amended) A composition useful for lithium ion batteries, comprising discrete and exfoliated carbon nanotubes, and mixtures of ion active materials comprising migratable ions, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes ~~having~~ have crystals or layers of lithium ion active materials attached to their surface, and wherein the carbon nanotubes are in a weight ratio of carbon nanotubes to lithium salts of 0.1% to 10%.

11. (Currently Amended) A composition useful for lithium ion batteries, comprising oxidized carbon nanotubes, and mixtures of ion active materials comprising migratable ions, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, wherein the discrete carbon nanotubes ~~having~~ have crystals or layers of lithium ion active materials attached to their surface, and wherein the carbon nanotubes are uniformly dispersed without clustering on a dimension scale of less than about 1 micrometer.

12. (Currently Amended) A composition useful for lithium ion batteries, comprising uniformly dispersible oxidized carbon nanotubes, and mixtures of ion active materials comprising

migratable ions, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1, and wherein the discrete carbon nanotubes ~~having~~ have crystals or layers of lithium ion active materials attached to their surface.

13. (Original) The composition of claim 12, wherein the crystals or layers of lithium ion active materials are chemically attached to the surface of the dispersible oxidized carbon nanotubes.

14. (New) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

15. (New) The composition of claim 1 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

16. (New) The composition of claim 10 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

17. (New) The composition of claim 10 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

18. (New) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

19. (New) The composition of claim 11 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

20. (New) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 3:1 to 25:1.

21. (New) The composition of claim 12 where the ratio of lithium ion to other total ions in the ion active materials is from 10:1 to 25:1.

REMARKS

Applicants have carefully considered this Application in connection with the Examiner's Action, and respectfully request reconsideration of this Application in view of the above Amendments and the following remarks.

Pending in the current application are Claims 1-7 and 10-21. Claims 8-9 have been withdrawn. Claims 14-21 are new. Support for these new claims is found throughout the specification, particularly at Paragraphs [0025] and [0028]. Claims 1, 10, 11, and 12 have been amended to recite that the composition includes mixtures of ion active materials comprising migratable ions, wherein a ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1. Support for this amendment is found throughout the specification, particularly at Paragraphs [0025] and [0028]. Claims 1 and 10 have also been amended to recite that the discrete nanotubes are exfoliated. Support for this amendment is found throughout the specification, particularly at Paragraphs [0024] and [0037]. Claim 3 has been amended to recite that the lithium metal salt is $LiFePO_4$ or $LiMnPO_4$. Support for this amendment is found in Paragraph [0003].

I. Election/Restrictions

Applicants note the Examiner's request for restriction to one of the following inventions:

I. Claims 1-7 and 10-13, drawn to a product.

II. Claims 8 and 9, drawn to a process.

Applicants affirm the election of Invention I, Claims 1-7 and 10-13, without traverse. Claims 8-9 have been withdrawn.

II. Double Patenting

Claims 1, 4-7, and 10-13 stand provisionally rejected on the ground of non-statutory double patenting over Claims 14 and 17-23 of co-pending Application Serial No. 14/128,392. Applicants submit herewith a terminal disclaimer with regard to co-pending Application Serial No. 14/128,392 and respectfully request that this rejection be withdrawn.

III. Claim Rejections – 35 U.S.C. §112

Claim 3 stands rejected under 35 U.S.C. §112 as being indefinite. The Examiner asserts that it is unclear whether Applicant is claiming crystalline $LiFePO_4$ (olivine) or another crystallized

lithium salt that has the same or similar crystal structure as $LiFePO_4$ (olivine). Applicants respectfully submit that Claim 3 has been amended to recite "wherein the lithium metal salt is $LiFePO_4$ or $LiMnPO_4$." Support for this amendment is found in Paragraph [0003] of the specification, which states "Olivine structures such as lithium iron phosphate, $LiFePO_4$, or lithium manganese phosphate, $LiMnPO_4$, operate at higher charge and discharge..." Accordingly, Claim 3 as amended refers to either $LiFePO_4$ (olivine) or $LiMnPO_4$ (olivine). Claim 3 as amended is not limited to $LiFePO_4$ (olivine).

IV. Rejections Under 35 U.S.C. §102

Claims 1, 2, 4, 6, 7, and 12 stand rejected under 35 U.S.C. §102(a) (pre-AIA), as being anticipated by International Patent Publication No. WO 2010/117392 to Bosnyak ("Bosnyak"). The Examiner asserts that Bosnyak discloses every limitation of Claims 1, 2, 4, 6, 7, and 12. Applicants respectfully disagree.

Applicants respectfully submit that Claim 1 has been amended to recite that the ion active materials include "migratable ions" and that the "ratio of lithium ion to other total ions in the ion active materials is at least 2:1 to 25:1". Bosnyak does not disclose the presence of migratable ions and does not disclose this range of ratios of lithium ions to other total ions in the ion active materials.

In view of this amendment and these remarks, Applicants respectfully assert that Claims 1, 2, 4, 6, 7, and 12 are not anticipated by Bosnyak and respectfully request that the rejection under 35 U.S.C. §102(b) (pre-AIA) be withdrawn.

V. Rejections Under 35 U.S.C. §103

A. Claim 3

Claim 3 stands rejected under 35 U.S.C. §103(a) (pre-AIA) as being unpatentable over Bosnyak in further view of U.S. Patent Publication No. 2011/0104551 to Yang ("Yang"). The Examiner notes that Bosnyak is silent with regard to olivine crystal structures but that Yang teaches crystalline $LiFePO_4$. The Examiner asserts that it would have been obvious to provide olivine crystals of LiFePO4 on the surface of the nanotubes disclosed by Bosnyak.

As already noted above, Bosnyak fails to disclose all limitations of amended Claim 1. Bosnyak does not teach the presence of "migratable ions" within the ion active material and does not teach a ratio of lithium ions to other total ions in the ion active materials of at least 2:1 to 25:1.

Bosnyak contains no specific teachings with regard to the use of lithium ions. In fact, Bosnyak simply refers to the possibility of modifying carbon nanotubes with an electroactive material. Bosnyak then goes on to say that the electroactive material could be any of (1) "a transition metal or transition metal oxide," (2) "conducting polymers such as, for example, polyaniline, polyacetylene and polyvinylpyrrole," or (3) " a nanomaterial" that may be "SnO_2, $LiTi_5O_{12}$, silicon nanotubes, silicon nanoparticles and various combinations thereof." See Bosnyak, Paragraph [0082]. Bosnyak places no particular emphasis on lithium ion active material and provides no teachings regarding the presence of migratable ions of any kind in any ratio, much less lithium ions in the specified ratio.

Further, there is nothing in Bosnyak, nor Yang, nor Bosnyak and Yang in combination, that would suggest the use of an olivine crystalline structure of lithium ion active material in combination with exfoliated carbon nanotubes. As discussed, Bosnyak places no particular emphasis on the use of lithium metal salts. The mere disclosure of $LiTi_5O_{12}$ does not constitute a teaching or suggestion that crystalline forms of lithium ion active material would be advantageous. In fact, Bosnyak teaches at Paragraphs [0052] and [0055]-[0056] that in certain embodiments nanocrystalline material is used to precipitate exfoliated carbon nanotubes and the residual nanocrystalline material is then removed from the exfoliated carbon nanotubes. It is clear from the teachings of Bosnyak that the preparation of exfoliated carbon nanotubes requires particular steps and particular reagents, particularly to ensure that the nanotubes do not re-bundle after they have been exfoliated. See Bosnyak, Paragraphs [0049]-[0057]. The use of crystalline ion active material to modify the exfoliated carbon nanotubes is thus not taught by Bosnyak, and there is no motivation to use the olivine crystalline material of Yang in combination with the teachings of Bosnyak.

Similarly, Yang does not suggest that the use of $LiFePO_4$ would be compatible with the claimed exfoliated nanotubes. Yang does not disclose discrete, exfoliated carbon nanotubes as the claims require. Paragraph [0024] of the present application makes it clear that discrete, exfoliated carbon nanotubes are a specific kind of nanotubes that are distinguishable from those found in other applications. Yang does not disclose any method for obtaining discrete, exfoliated carbon nanotubes. Further, although Yang suggests the use of "nanotubular base material" that can be made up of carbon nanotubes, Yang does not suggest the use of $LiFePO_4$ in combination with this material. Yang's disclosure of $LiFePO_4$ is made in the background only as an example of ways in which current Li-ion batteries have been improved. Yang states that "[c]urrent LIB capacity has also been improved by utilizing new cathode materials, such as layered $Li[Ni_xCO_yMn_z]O_2$, Li-Mn-O

spinels, $LiFePO_4$ (olivine), and related materials." See Yang, Paragraph [0004]. Yang never suggests the use of any of this technology in combination with the disclosed nanotubular base material. In fact, Yang notes that these "new cathode materials" may provide some increase in total mAh/g capacity, but it is still insufficient to satisfy the needs of hybrid electric vehicles. Thus, there is no teaching or suggestion in Yang that the use of $LiFePO_4$ (olivine) in combination with any carbon nanotubular material, much less the claimed exfoliated discrete carbon nanotubes, would be advantageous.

In view of these amendments and remarks, Applicants respectfully submit that Claim 3 is patentable under 35 U.S.C. §103(a) in view of Bosnyak and in further view of Yang.

B. Claim 10

Claim 10 stands rejected under 35 U.S.C. §103(a) (pre-AIA) as being unpatentable over Bosnyak in further view of U.S. Patent Publication No. 2010/0159331 to Lee et al. ("Lee"). The Examiner notes that Bosnyak does not teach that the weight ratio of carbon nanotubes to lithium salts is 0.1% to 10%. The Examiner argues that Lee teaches the use of carbon nanotubes and non-carbonaceous active material in a ratio of 33% to about 2% and also 9.7%. The Examiner argues it would have been obvious to use the claimed range in order to prevent irreversible reactions and provide optimal binding. Applicants respectfully disagree.

As already discussed in detail above, Bosnyak does not teach or suggest all underlying limitations of amended Claim 1. Bosnyak does not teach the presence of "migratable ions" within the ion active material and does not teach a ratio of lithium ions to other total ions in the ion active materials of at least 2:1 to 25:1. Lee is similarly silent on the use of lithium ion active material, as Lee teaches only the use of a non-carbonaceous material that is silicon, silicon oxide, or Si-Y, where Y does not include lithium. Accordingly, neither Bosnyak nor Lee teaches or suggests lithium ion active material having the recited ratio of lithium ions to other total ions.

Further, the teachings of Lee do not pertain to, and are not applicable to, the use of discrete, exfoliated carbon nanotubes as the claims require. Lee teaches the use of common carbon nanotubes and particularly suggests that the carbon nanotubes and non-carbonaceous material should be bead-milled or ball-milled together to form the desired composite. See Lee, Paragraph [0030] and [0040]. This process of bead-milling or ball-milling is wholly incompatible with the use of discrete, exfoliated carbon nanotubes. As discussed in Paragraph [0024] of the specification, exfoliated

carbon nanotubes require particular attention to separation, distribution, and tube length. As expected, bead-milling or ball-milling would only produce a disorganized mass of broken and interconnected nanotubes. Thus, the teachings of Lee are not applicable to the use of discrete, exfoliated carbon nanotubes as the claims require.

In view of these amendments and remarks, Applicants respectfully submit that Claim 10 is patentable under 35 U.S.C. §103(a) in view of Bosnyak and in further view of Lee.

C. Claims 5 and 11-13

Claims 5 and 11-13 stands rejected under 35 U.S.C. §103(a) (pre-AIA) as being unpatentable over Bosnyak in view of Kim, Carbon 2005 ("Kim"). The Examiner argues that Bosnyak teaches all underlying limitations of these claims except for the oxidation of the carbon nanotubes. The Examiner asserts that Kim teaches the oxidation of carbon nanotubes as creating minor damage and increasing the electrical conductivity and that it would have been obvious to oxide the carbon nanotubes of Bosnyak in view of the teachings of Kim. Applicants respectfully disagree.

As already discussed in detail above, Bosnyak does not teach or suggest all underlying limitations of amended Claim 1. Bosnyak does not teach the presence of "migratable ions" within the ion active material and does not teach a ratio of lithium ions to other total ions in the ion active materials of at least 2:1 to 25:1. Kim is also silent on the potential for using lithium ion active material in conjunction with discrete, exfoliated carbon nanotubes.

In addition, Applicants respectfully submit that Kim teaches that causing damage to the carbon nanotubes through oxidation actually causes "the electrical conductivity to be ***lowered***." See Kim, Abstract (emphasis added). As discussed in Kim, Page 24, second paragraph, "the oxidation layer on the surface of the carbon fiber increases the contact resistance between the fibers." Kim goes on to caution that oxidation of carbon nanotubes "should be carried out under conditions in which no damage is caused" to the nanotubes and "no impurities are generated" by carefully controlling the conditions. See Kim, Page 30. Thus, there is no motivation to combine the teachings of Kim with the teachings of Bosnyak. Kim teaches that rigorous oxidation may cause damage to the nanotubes and that such damage should be avoided, as it lowers the electrical conductivity.

In addition, Kim does not teach the oxidation of exfoliated carbon nanotubes. Kim teaches the formation of nanotube/epoxy composites under oxidation conditions. See Kim, Page 26, last paragraph. In fact, Kim discourages processes relating to the purification of nanotubes by discussing

in detail the potential to cause damage to the nanotubes due to the use of concentrated acidic solution. See Kim, Page 24, second paragraph.

In view of these amendments and remarks, Applicants respectfully submit that Claims 5 and 11-13 are patentable under 35 U.S.C. §103(a) in view of Bosnyak and in further view of Kim.

CONCLUSION

Applicants respectfully submit that in light of the foregoing amendment and comments, Claims 1-7 and 10-13 are in condition for allowance. A Notice of Allowance is respectfully requested.

If additional information is required, the Examiner is encouraged to contact the undersigned at (214) 953-5959 so that such issues may be resolved as expeditiously as possible.

The Commissioner is hereby authorized to charge any additional fee or credit any refund to Deposit Account No. 10-0096.

Date: January 13, 2015

Respectfully submitted,

By: _____
T. Ling Chwang
Reg. No. 33,590

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PTO/AIA/22 (03-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional): DENA-0008 137124.00041)

Application Number: 13/529,797

Filed: June 21, 2012

For: LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF & PRODUCTS OBTAINED THEREFROM

Art Unit: 1726

Examiner: Eric M. Connelly

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	Micro Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$200	$100	$50	$
☐	Two months (37 CFR 1.17(a)(2))	$600	$300	$150	$
☑	Three months (37 CFR 1.17(a)(3))	$1,400	$700	$350	$ 700.00
☐	Four months (37 CFR 1.17(a)(4))	$2,200	$1,100	$550	$
☐	Five months (37 CFR 1.17(a)(5))	$3,000	$1,500	$750	$

☑ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 10-0096.

☑ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☐ attorney or agent of record. Registration number _____.

☑ attorney or agent acting under 37 CFR 1.34. Registration number 33,590.

/T. Ling Chwang/ — Signature

January 13, 2015 — Date

T. Ling Chwang — Typed or printed name

214-953-5959 — Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☑ * Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Electronic Patent Application Fee Transmittal

Application Number:	13529797
Filing Date:	21-Jun-2012
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Filer:	T. Ling Chwang/Debbie Sams
Attorney Docket Number:	DENA-0008 (137124.00041)

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	2253	1	700	700
Miscellaneous:				
		Total in USD ($)		**700**

Electronic Acknowledgement Receipt	
EFS ID:	21201233
Application Number:	13529797
International Application Number:	
Confirmation Number:	1004
Title of Invention:	LITHIUM ION BATTERIES USING DISCRETE CARBON NANOTUBES, METHODS FOR PRODUCTION THEREOF AND PRODUCTS OBTAINED THEREFROM
First Named Inventor/Applicant Name:	Clive P. Bosnyak
Customer Number:	117364
Filer:	T. Ling Chwang/Debbie Sams
Filer Authorized By:	T. Ling Chwang
Attorney Docket Number:	DENA-0008 (137124.00041)
Receipt Date:	13-JAN-2015
Filing Date:	21-JUN-2012
Time Stamp:	20:06:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$700
RAM confirmation Number	5181
Deposit Account	100096
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		011315_Amendment.pdf	713902 0364e159391dbcb26f9b5bba286c75f75b20bebb	yes	11
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	4	
	Applicant Arguments/Remarks Made in an Amendment		5	11	
Warnings:					
Information:					
2	Extension of Time	011315_Extension_of_Time.pdf	113690 ddd702e31496943f7fb0acb08b7bd25dc9ecb0eb	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	31059 0e19cfe28398c66329ec4ae7779bc062fbab8fd6	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	858651		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/529,797	Filing Date 06/21/2012	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 = *		X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 = *		X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	01/13/2015	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 21	Minus	** 20	= 1	X $40 =	40
	Independent (37 CFR 1.16(h))	* 6	Minus	***6	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**40**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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/VANESSA BARBER/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/529,797	06/21/2012	Clive P. Bosnyak	DENA-0008 (137124.00041)	1004

117364 7590 07/15/2014

Molecular Rebar Design, LLC
Jackson Walker L.L.P.
901 Main Street, Suite 6000
Dallas, TX 75202

EXAMINER	
CONNELLY, ERIC M	
ART UNIT	**PAPER NUMBER**
1723	

MAIL DATE	DELIVERY MODE
07/15/2014	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 13/529,797	Applicant(s) BOSNYAK ET AL.	
	Examiner ERIC CONNELLY	Art Unit 1723	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06/21/2012*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-13* is/are pending in the application.

5a) Of the above claim(s) *8 and 9* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-7 and 10-13* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *06/21/2012* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date *10/17/2012 07/16/2013 10/11/2013 11/19/2013*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

Claims Status

Claims 1-13 are pending.

Claims 8 and 9 are withdrawn for being non-elected

Claims 1-7 and 10-13 are examined and rejected.

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-7 and 10-11, drawn to a product, classified in 429/231.8.

II. Claims 8 and 9, drawn to a process, classified in 427/113.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product could be made using nanotubes of aspect ratio over 500.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because one or more of the following reasons apply:

the inventions have acquired a separate status in the art in view of their different classification, and

the inventions require a different field of search (e.g., searching different classes/subclasses or electronic resources, or employing different search strategies or search queries).

Applicant is advised that the reply to this requirement to be complete must include (i) an election of an invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention**.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Sara Borrelli on 05/13/2014 a provisional election was made without traverse to prosecute the invention of invention I, claims 1-7 and 10-13. Affirmation of this election must be made by applicant in replying to this Office action. Claims 8 and 9 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be corrected in compliance with 37 CFR 1.48(a) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. A request to correct inventorship under 37 CFR 1.48(a) must be accompanied by an application data sheet in accordance with 37 CFR 1.76 that identifies each inventor by his or her legal name and by the processing fee required under 37 CFR 1.17(i).

The examiner has required restriction between product or apparatus claims and process claims. Where applicant elects claims directed to the product/apparatus, and all product/apparatus claims are subsequently found allowable, withdrawn process claims that include all the limitations of the allowable product/apparatus claims should be

considered for rejoinder. All claims directed to a nonelected process invention must include all the limitations of an allowable product/apparatus claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product/apparatus claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product/apparatus are found allowable, an otherwise proper restriction requirement between product/apparatus claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product/apparatus claim will not be rejoined. See MPEP § 821.04. Additionally, in order for rejoinder to occur, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product/apparatus claims. **Failure to do so may result in no rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled

out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 1, 4-7, 10-13 are provisionally rejected on the ground of nonstatutory double patenting over claims 14 and 17-23 of copending Application No. 14/128,392. This is a provisional double patenting rejection because the patentably indistinct claims have not in fact been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: claim 14 of the copending applications reads on claim 1 of the instant application, 17 on 4, 14 on 5, 18 on 6, 19 on 7, 20 on 10, 21 on 11, 22 on 12, and 23 on 13. Examiner acknowledges the wording of copending claims have been slightly changed to overcome 112 and claim objections of the copending application, but the claimed subject matter has not changed.

Furthermore, there is no apparent reason why applicant would be prevented from presenting claims corresponding to those of the instant application in the other copending application. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 3 is rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Regarding claim 3, it is unclear whether applicant is claiming crystalline LiFeP04 (olivine) or another crystallized lithium salt that has the same or similar crystal structure as LiFeP04 (olivine). To expedite examination, it is assumed that applicant is claiming crystalline LiFeP04 (olivine).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 2, 4, 6, 7, and 12 are rejected under pre-AIA 35 U.S.C. 102(a) as being anticipated by Bosnyak (WO 2010/117392).

Regarding claim 1, Bosnyak teaches discrete carbon nanotubes having lithium ion active material bound to their surface [para 0082].

Regarding claim 2, Bosnyak teaches the active material comprises a lithium metal salt and titanium [$Li_4Ti_50_{12}$, para 0082].

Regarding claim 4, Bosnyak teaches the active material comprises titanium [$Li_4Ti_50_{12}$, para 0082].

Regarding claim 6, Bosnyak teaches the active material may comprise graphene [para 0106]. By definition, carbon nanotubes are encircled graphene layers.

Regarding claim 7, Bosnyak teaches the active material may comprise graphene [para 0106]. The weight ratio of graphene to carbon nanotubes of 0.1.:99.9 to 99.9:0.1 is considered implicit. By definition, carbon nanotubes are encircled graphene layers.

Regarding claim 12, Bosnyak teaches isolated exfoliated discrete carbon nanotubes having lithium ion active material bound to their surface [para 0082].

Claim Rejections - 35 USC § 103

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 3 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Bosnyak (WO 2010/117392) in further view of Yang (US PG-Pub 2011/0104551).

Regarding claim 3, Bosnyak is silent to LiFeP04 (olivine).

Yang teaches crystaline LiFeP04 (olivine) [para 0004].

Yang teaches crystaline LiFeP04 (olivine) provides about 9 to about 18% increase in total mAh/g capacity of a electrochemical cell [para 0004].

It would have been obvious to a person having ordinary skill in the art at the time of invention to provide crystals of LiFeP04 (olivine) on the surface of Bosnyak's carbon

nanotubes in order to provide an increase in total mAh/g capacity of the electrochemical cell [para 0004].

Claim 10 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Bosnyak (WO 2010/117392) in further view of Lee (PG-Pub 2010/0159331)

Regarding claim 10, Bosnyak teaches discrete carbon nanotubes having lithium ion active material bound to their surface [para 0082]. Bosnyak teaches the active material comprises a lithium metal salt [$Li_4Ti_50_{12}$, para 0082].

Bosnyak is silent to the nanotubes being in a weight ratio of carbon nanotubes to lithium salts of 0.1% to 10%.

Lee teaches active material with a non-carbonaceous material to carbon nanotubes ratio of 2:1 to about 50:1 (33% to about 2% carbon nanotubes to non-carbonaceous active material) [para 0033]. Lee teaches active material with 65 weight parts SiO_x and 7 weight parts carbon nanotubes (9.7% carbon nanotubes to non-carbonaceous active material) [para 0065].

Lee teaches if the amount of the carbon nanoparticles is too high, too many irreversible reactions may occur, when a lithium secondary battery including the negative active material is charged and/or discharged and if the amount of the carbon nanoparticles is too low, the binding effect may be insufficiently sustained.

It would have been obvious to a person having ordinary skill in the art at the time of invention to provide a carbon nanotube to lithium salt ratio of 0.1 to 10 wt% to

Bosnyak in order to prevent irreversible reactions and to provide optimal binding between lithium salts and the carbon nanotubes.

Claims 5 and 11-13 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Bosnyak (WO 2010/117392) in further view of Kim (2005 Carbon).

Regarding claim 5, Bosnyak teaches carbon nanotube aspect ratios of at least about 100 [para 0042].

Bosnyak is silent to the oxidation of carbon nanotubes.

Kim teaches oxidation of carbon nanotubes creates minor damage to the crystalline structures and increases the electrical conductivity of carbon nanotubes [abstract].

It would have been obvious to a person having ordinary skill in the art at the time of invention to select carbon nanotubes having an oxidation level of 1% to 15% in order to increase the electrical conductivity of the carbon nanotubes. Oxidation levels of 1% to 15% are considered to be equivalent to minor damage as taught.

Regarding claim 11, Bosnyak teaches discrete carbon nanotubes having lithium ion active material bound to their surface [para 0082]. Bosnyak teaches isolated exfoliated carbon nanotubes which are considered to uniformly dispersed without clustering on a dimension scale less than 1 micrometer.

Bosnyak is silent to the oxidation of carbon nanotubes.

Kim teaches oxidation of carbon nanotubes creates minor damage to the crystalline structures and increases the electrical conductivity of carbon nanotubes [abstract].

It would have been obvious to a person having ordinary skill in the art at the time of invention to oxidize the carbon nanotubes of Bosnyak in order to create minor damage to the crystalline structure and therefor increase the electrical conductivity of the carbon nanotubes.

Regarding claim 12, Bosnyak teaches discrete carbon nanotubes having lithium ion active material bound to their surface [para 0082]. Bosnyak teaches isolated exfoliated carbon nanotubes which are non-aggregated and therefor considered to be uniformly dispersed without clustering on a dimension scale less than 1 micrometer.

Bosnyak is silent to the oxidation of carbon nanotubes.

Kim teaches oxidation of carbon nanotubes creates minor damage to the crystalline structures and increases the electrical conductivity of carbon nanotubes [abstract].

It would have been obvious to a person having ordinary skill in the art at the time of invention to oxidize the carbon nanotubes of Bosnyak in order to create minor damage to the crystalline structure and therefor increase the electrical conductivity of the carbon nanotubes.

Regarding claim 13, Bosnyak teaches the lithium active material is chemically attached to the surface of [nanomaterial/nanoparticles bound, para 0082].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC CONNELLY whose telephone number is (571)272-9986. The examiner can normally be reached on Monday-Friday 9:30am-6:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on 571-272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERIC CONNELLY/
Examiner, Art Unit 1723

/MILTON I CANO/
Supervisory Patent Examiner
Art Unit 1723

Notice of References Cited	Application/Control No. 13/529,797	Applicant(s)/Patent Under Reexamination BOSNYAK ET AL.	
	Examiner ERIC CONNELLY	Art Unit 1723	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2010/0159331 A1	06-2010	Lee et al.	429/231.8
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Kim YJ, Shin TS, Choi HD, Kwon JH, Chung YC, Yoon HG. Electrical conductivity of chemically modified multiwalled carbon nanotube/epoxy composites. Carbon 2005;43: 23-30.
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	13529797
	Filing Date	2012-06-21
	First Named Inventor	Clive P. Bosnyak
	Art Unit	1726
	Examiner Name	Unknown
	Attorney Docket Number	DENA-0008 (137124.41)

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