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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/374,803	07/13/2021	Bolin Zhou	024607-02-5110-US	5191
24341	7590	07/11/2023		
Morgan, Lewis & Bockius LLP (PA) 1400 Page Mill Road Palo Alto, CA 94304-1124			EXAMINER SHEIKH, HAROON S	
			ART UNIT	PAPER NUMBER
			1751	
			NOTIFICATION DATE	DELIVERY MODE
			07/11/2023	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):

donald.mixon@morganlewis.com
padocketingdepartment@morganlewis.com



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APPLICATION NO.	ISSUE DATE	PATENT NO.
17/374,803	11-Jul-2023	11699808

Morgan, Lewis & Bockius LLP (PA)
1400 Page Mill Road
Palo Alto, CA 94304-1124

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at <https://patentcenter.uspto.gov>

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit <https://www.uspto.gov/electronicgrants>



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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/374,803	07/11/2023	11699808	024607-02-5110-US	5191

24341 7590 06/21/2023

Morgan, Lewis & Bockius LLP (PA)
1400 Page Mill Road
Palo Alto, CA 94304-1124

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at <https://patentcenter.uspto.gov/>. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at <https://certifiedcopycenter.uspto.gov/index.html>. The Certified Copy Center may be reached at (800)972-6382.

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 0 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 Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional inventors):

Bolin Zhou, Ningde, CHINA;

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

NINGDE AMPEREX TECHNOLOGY LIMITED, Ningde, CHINA;

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.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/374,803	07/13/2021	Bolin Zhou	024607-02-5110-US	5191

EXAMINER	
SHEIKH, HAROON S	

ART UNIT	PAPER NUMBER
1751	

NOTIFICATION DATE	DELIVERY MODE
05/31/2023	ELECTRONIC

7590 05/31/2023
Morgan, Lewis & Bockius LLP (PA)
1400 Page Mill Road
Palo Alto, CA 94304-1124

NOTICE OF NON-COMPLIANT INFORMATION DISCLOSURE STATEMENT

An Information Disclosure Statement (IDS) filed 5.24.2023 in the above-identified application fails to meet the requirements of 37 CFR 1.97(d) for the reason(s) specified below. Accordingly, the IDS will be placed in the file, but the information referred to therein has not been considered.

The IDS is not compliant with 37 CFR 1.97(d) because:

☒ The IDS lacks a statement as specified in 37 CFR 1.97(e).

☐ The IDS lacks the fee set forth in 37 CFR 1.17(p).

☐ The IDS was filed after the issue fee was paid. Applicant may wish to consider filing a petition to withdraw the application from issue under 37 CFR 1.313(c) to have the IDS considered. See MPEP 1308.

N. Horne, for
571-272-4200 or 1-888-786-0101
Application Assistance Unit
Office of Data Management

PART B - FEE(S) TRANSMITTAL

Electronically filed May 26, 2023

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

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, advanced 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**MORGAN, LEWIS & BOCKIUS LLP**
1400 Page Mill Road
Palo Alto, CA 94304

Note: A certificate of mailing below 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.

Certificate of Mailing

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	ATTY'S DOCKET NO.	CONFIRMATION NO.
17/374,803	07/13/2021	Bolin Zhou	024607-02-5110-US	5191

TITLE OF INVENTION: BATTERY

APPLN. TYPE	ENTITY STATUS	ISSUE FEE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$1200	06/01/2023

EXAMINER	ART UNIT	CLASS-SUB CLASS
SHEIKH, HAROON S	1751	429/096000

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) 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. Morgan, Lewis & Bockius LLP

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:

NINGDE AMPEREX TECHNOLOGY LIMITED

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

NINGDE, FUJIAN, CHINA

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
- ☐ Advanced Order - # of Copies _____

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

- ☐ A check in the amount of the fee(s) enclosed
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☒ The Director is hereby authorized to charge the required fee(s), or credit any overpayment, to Deposit Account Number 50-0310 (order no. 024607-02-5110-US).

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

- ☐ a. 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 (see form 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 sign in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature: /Yalei Sun/Date: May 26, 2023Printed Name: Yalei SunRegistration No. 57,765

Electronic Patent Application Fee Transmittal				
Application Number:		17374803		
Filing Date:		13-Jul-2021		
Title of Invention:		BATTERY		
First Named Inventor/Applicant Name:		Bolin Zhou		
Filer:		Yalei Sun/Jackeline De Ranieri		
Attorney Docket Number:		024607-02-5110-US		
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	1200	1200

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1200

Electronic Acknowledgement Receipt

EFS ID:	48065523
Application Number:	17374803
International Application Number:	
Confirmation Number:	5191
Title of Invention:	BATTERY
First Named Inventor/Applicant Name:	Bolin Zhou
Customer Number:	24341
Filer:	Yalei Sun
Filer Authorized By:	
Attorney Docket Number:	024607-02-5110-US
Receipt Date:	26-MAY-2023
Filing Date:	13-JUL-2021
Time Stamp:	17:25:16
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$1200
RAM confirmation Number	E20235PH25435921
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)	024607-02-5110-US_Issue_Fee_Transmittal.pdf	110959	no	1
			4c033c7190944b30646f19022da469457ca7f78b		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37394	no	2
			366ed522da6ecc59e9064b51fd2b00c80559af84		
Warnings:					
Information:					
Total Files Size (in bytes):			148353		
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				Electronically filed May 24, 2023		
				Application Number	17/374,803	
				Filing Date	July 13, 2021	
				First Named Inventor	Bolin Zhou	
				Art Unit	1751	
Examiner Name	Haroon S. SHEIKH					
Sheet	1	of	1	Attorney Docket Number	024607-02-5110-US	

U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	Document Number Number - Kind Code	Publication Date MM-DD- YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	
FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document Country Code – Number - Kind Code (<i>if known</i>)	Publication Date MM-DD- YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T
		CN102931368 B	6/22/2016	Dongguan New Energy Technology Co., Ltd.		
NON PATENT LITERATURE DOCUMENTS						
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, page(s), volume-issue number(s), publisher, city and/or country where published				

Examiner Signature		Date Considered	
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DB2/ 45848747.1

Electronically filed May 24, 2023

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Bolin Zhou	Confirmation No.:	5191
Serial No.:	17/374,803	Art Unit:	1751
Filed:	July 13, 2021	Examiner:	Haroon S. SHEIKH
For:	BATTERY	Attorney Docket No.:	024607-02-5110-US

INFORMATION DISCLOSURE STATEMENT SUBMITTED UNDER 37 C.F.R. § 1.97(i)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the duty of disclosure provisions of 37 C.F.R. §1.56, there is hereby provided certain information that the applicant considers cumulative with respect to references already of record in the subject U.S. patent application or otherwise not material to the examination of the application. It is requested that the references cited herein be made of record in the application in accordance with rule 37 C.F.R. §1.97(i).

1. Enclosures accompanying this Information Disclosure Statement are:
 - 1a. ☒ A list of all patents, publications, applications, or other information submitted for consideration by the office.
 - 1b. A legible copy of :
 - ☒ Each foreign patent;
 - ☐ Each publication or that portion which caused it to be listed on the PTO-1449;
 - ☐ For each cited pending U.S. application, the application specification including the claims, and any drawing of the application, or portion of the application which caused it to be listed on the PTO-1449 including any claims directed to that portion;
 - ☐ all other information or portion which caused it to be listed on the PTO-1449.
 - 1c. ☐ An English language copy of search report(s) from a counterpart foreign application or PCT International Search Report.
 - 1d. ☐ Explanations of relevancy (ATTACHMENT 1(d), hereto) or English language abstracts of the non-English language publications.

2. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(b):
- ☐ Within three months of the filing date of a national application other than a continued prosecution application under §1.53(d);
 - ☐ Within three months of the date of entry of the national stage as set forth in §1.491 in an international application;
 - ☐ Before the mailing of the first Office action on the merits;
 - ☐ Before the mailing of a first Office action after the filing of a request for continued examination under §1.114.

3. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(c) after the period specified in 37 C.F.R. §1.97(b), but before the mailing date of any of a final action under 37 C.F.R. §1.113, a notice of allowance under 37 C.F.R. §1.311 or an action that otherwise closes prosecution in the application.

(Check either Item 3a, 3b or 3c)

- 3a. ☐ The Certification Statement in Item 5 below is applicable. Accordingly, no fee is required.
- 3b. ☐ The \$260 (large entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c).
- 3c. ☐ The \$104 (small entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c).

(Items 3b or 3c to be checked if any reference known for more than 3 months)

4. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(d) after the period specified in 37 C.F.R. §1.97(c), but on or before the date of payment of the issue fee.

(Check either Item 4a and 4b or 4c)

- 4a. ☐ The Certification Statement in Item 5 below is applicable.
- 4b. ☐ The \$260 (large entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c).
- 4c. ☐ The \$104 (small entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c).

5. ☒ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(i) as it does not comply with § 1.97(a)-(d), Applicants request that this Information Disclosure Statement be placed in the file by the office.

6. ☐ Copies of each cited U.S. patent and each U.S. patent application publication are not enclosed pursuant to the USPTO OG Notice dated 05 August 2003 waiving the requirement under 37 C.F.R. 1.98(a)(2)(i) for U.S. patent applications filed after June 30, 2003.

7. ☐ This application is a continuing application under 37 C.F.R. §1.53(b) or (d).

(Check appropriate Items 7a, 7b and/or 7c)

7a. ☐ A Petition to Withdraw from issue under 37 C.F.R. §1.313(b)(5) is concurrently filed herewith.

7b. ☐ Copies of publications listed on Form PTO-1449 from prior application Serial No. _____, filed on _____, of which this application claims priority under 35 U.S.C. §120, are not being submitted pursuant to 37 C.F.R. §1.98(d).

7c. ☐ Copies of the publications listed on Form PTO-1449 were not previously cited in prior application Serial No. _____, filed on _____, and are provided herewith.

8. ☐ This is a Supplemental Information Disclosure Statement. (Check Item 8a)

8a. ☐ This Supplemental Information Disclosure Statement under 37 C.F.R. §1.97(f) supplements the Information Disclosure Statement filed on _____. A bona fide attempt was made to comply with 37 C.F.R. §1.98, but inadvertent omissions were made. These omissions have been corrected herein. Accordingly, additional time is requested so that this Supplemental Information Disclosure Statement can be considered as if properly filed on _____.

9. ☐ In accordance with 37 C.F.R. §1.98, a concise explanation of what is presently understood to be the relevance of each non-English language publication is:

(Check Item 9a, 9b, or 9c)

9a. ☐ satisfied because all non-English language publications were cited on the enclosed English language copy of the PCT International Search Report or the search report from a counterpart foreign application indicating the degree of relevance found by the foreign office.

9b. ☐ set forth in the application.

9c. ☐ enclosed as an attachment hereto.

10. ☒ The Director is hereby authorized to charge any required fees to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 024607-02-5110-US).
11. ☒ No admission is made that the information cited in this Statement is, or is considered to be, material to patentability nor a representation that a search has been made (other than a search report of a foreign counterpart application or PCT International Search Report if submitted herewith). 37 C.F.R. §§1.97(g) and (h).

Respectfully submitted,

Date: May 24, 2023

/Yalei Sun/ 57,765
Yalei Sun (Reg. No.)
MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
(650) 843-4000



Espacenet

Bibliographic data: CN102931368 (B) — 2016-06-22

Widening structure of flexible package lithium ion cell and manufacturing method of widening structure

Inventor(s): SHI ZHA, ; 史册

Applicant(s): AMPEREX TECHNOLOGY LTD, ; 东莞新能源科技有限公司

Classification: - **international:** *H01M10/058; H01M2/14*
- **cooperative:** *Y02E60/10 (EP); Y02P70/50 (EP)*

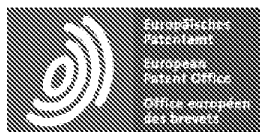
Application number: CN201210405678 20121023 Global Dossier

Priority number(s): CN201210405678 20121023

Also published as: CN102931368 (A)

Abstract of CN102931368 (A)

The invention belongs to the technical field of lithium ion batteries, in particular to a widening structure of a flexible package lithium ion cell and a manufacturing method of the widening structure. The widening structure of the flexible package lithium ion cell comprises a cell main body side edge and packaging folded edges which are positioned on two sides of the cell main body side edge, wherein a widened area is formed between the cell main body side edge and the packaging folded edges; a filler is arranged in the widened area; one side of the filler is adhered to the cell main body side edge, and one side of the filler is adhered to one of the packaging folded edges; or one side of the filler is adhered to the cell main body side edge, and the other side of the filler is adhered to one of the packaging folded edges. By adoption of the widened area according to the structure, a narrow cell can be widened, the width consistency of the cell is effectively improved, and the cell can be fixed in a battery. According to the method, a packaged cell with small width can be widened by forming the widened area between the cell main body side edge and the packaging folded edges. The method can serve as a remedial measure, so the width consistency of the cell is improved.



Notice

This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output.

DESCRIPTION CN102931368B

10 A kind of widening structure of flexible packaging lithium-ion battery and its manufacturing method

[0001]

14 technical field

[0002]

18 The invention belongs to the technical field of lithium-ion batteries, in particular to a soft-packed lithium-ion battery core widening structure and a manufacturing method thereof.

[0003]

23 Background technique

[0004]

27 As an environmentally friendly secondary battery, lithium-ion batteries have been widely used in portable devices such as mobile phones, cameras, and notebook computers.

[0005]

32 Flexible packaging lithium-ion cells are usually wound structures. Due to the fluctuations in the thickness of the positive electrode sheet, negative electrode sheet, and separator, as well as the difference in winding tension, the width consistency of the wound cells is poor. When the cells are assembled (Pack), the cells with small width are difficult to be well fixed in the Pack, which will lead to potential poor electrical contact and safety problems.

[0006]

40 At present, there are two main processing methods for Pack: one is to pack the battery cells into a plastic frame with a fixed size, and then add a circle of wrapping paper (A-Pack) on the outside; the other is to use aluminum foil with a certain strength directly for the cells (About 1.0mm thick) is wound around the width direction, then the top cover and the bottom cover are assembled, and finally a wrapping paper (B-Pack) is added to the outside.

45 In order to improve the fixation of the narrow cell in the Pack, for A-Pack, after the cell is installed in the plastic frame, hot melt glue is usually injected into the gap between the two sides of the cell and the plastic frame to improve the cell Fixed with Pack.

48 However, with the development of automation in process production, the amount of automatic glue injection will be constant, which leads to the fact that hot melt glue cannot effectively fill the gap between the narrow battery cell and the plastic frame, and the phenomenon that the two are not firmly fixed reappears.

51 As for the B-Pack, there is currently no better way to improve the fixing method of the battery in the Pack in the industry.

[0007]

56 As shown in FIG. 1 , a schematic diagram of the battery cell structure after folding in the prior art, the package folding edge 2 is shaped and tightly attached to the side 1 of the battery cell body.

58 The width of the cell is equal to the width of the main body of the cell plus the thickness of the packaging flange 2 itself.

[0008]

63 Contents of the invention

[0009]

67 The object of the present invention is to provide a widened structure of a soft-packed lithium-ion battery cell and a manufacturing method thereof in view of the deficiencies of the prior art.

69 This structure can effectively improve the consistency of the width of the soft-packed lithium-ion battery and ensure that the battery is fixed in the battery. For batteries with a narrower shipping width, this method is provided between the side of the main body of the battery and the folded edge of the battery package. Widening the area to make the cell wider can be used as a remedy to improve cell width uniformity.

[0010]

76 In order to achieve the above object, the present invention provides a widening structure of a soft-packed lithium-ion battery. The technical solution is as follows: a widening structure of a soft-packed lithium-ion battery, including the side of the main body of the battery and the side of the main body of the battery. Encapsulation folds on both sides, a widened area is provided between the side of the main body of the battery

cell and the encapsulation fold, a filler is provided in the widened area, and one side of the filler is connected to the The side of the main body of the cell is bonded, one side of the filler is bonded to the hem of the package, or one side of the filler is bonded to the side of the cell body, and the other side of the filler is One side is bonded to the package flange.

[0011]

87 The filler includes at least one of double-sided adhesive tape, crepe adhesive tape and Dupont adhesive tape.

[0012]

91 One side of the filler is bonded to the side of the battery core body, and the other side of the filler is in contact with the folded edge of the package.

[0013]

96 One side of the filler is bonded to the folded edge of the package, and the other side of the filler is in contact with the side of the battery core body.

[0014]

101 The length of the package folding edge is greater than 1.5mm.

[0015]

105 The length of the package folding edge is greater than 3mm.

[0016]

109 The folded height of the packaging folded edge is less than or equal to the height of the side of the main body of the battery cell.

[0017]

114 The folded height of the packaging folded edge is greater than the height of the side of the main body of the battery cell.

[0018]

119 The present invention also provides a method for manufacturing a widened structure of a soft-packed lithium-ion battery, the steps comprising:

[0019]

124 (1) Detect the width of flexible packaging lithium-ion batteries, and classify narrower batteries according to their width;

[0020]

129 (2) Make the package folding edge of the narrow battery cell in the unfolded state, and the package folding edge forms an angle of 60-120 degrees with the side of the main body of the battery cell;

[0021]

134 (3) According to the extent to which the cell needs to be widened, paste the filler on the folded edge of the package, or on the side of the main body of the cell, or at the corner between the folded edge of the package and the side of the main body of the cell;

[0022]

140 (4) Use shaping equipment to fold the folded edge of the package so that it is closely attached to the side of the main body of the battery cell.

[0023]

145 The beneficial effect of the present invention is that: the present invention provides a flexible packaging lithium-ion cell widening structure and a manufacturing method thereof.

147 The filler provided in the widened area of the structure can widen the narrow cell, effectively improve the consistency of the cell width, and ensure that the cell is fixed in the battery. The widening area provided between the side of the main body of the cell and the folded edge of the cell package to widen the cell can be used as a remedial measure to improve the consistency of the cell width.

[0024]

154 Description of drawings

[0025]

158 Fig. 1 is a schematic structural diagram of the prior art.

[0026]

162 Fig. 2 is a schematic diagram of the structure of the cell before folding according to the present invention.

[0027]

166 Fig. 3 is a schematic diagram of a cell in which the widening area is set on the side of the cell body and the corner of the package hem according to the present invention.

[0028]

171 Fig. 4 is a schematic diagram of a cell in which the widening area is arranged on the side of the cell body according to the present invention.

[0029]

176 Fig. 5 is a schematic diagram of a battery cell in which the widened area is arranged on the folded edge of the package according to the present invention.

[0030]

181 Fig. 6 is a side view of the widened structure of the cell after folding according to the present invention.

[0031]

185 Detailed ways

[0032]

189 The present invention will be described in further detail below in conjunction with the examples and the accompanying drawings, but the implementation of the present invention is not limited thereto.

[0033]

194 As shown in Figures 2 to 6, a flexible packaged lithium-ion cell widening structure includes the side 1 of the main body of the battery and the packaging folds 2 located on both sides of the side 1 of the main body of the battery, the side 1 of the main body of the battery and the packaging A widened area 4 is provided between the folded edges 2, and a filler 3 is arranged in the widened area 4. One side of the filler 3 is bonded to the side 1 of the main body of the cell, and one side of the filler 3 is bonded to the package fold. The side 2 is bonded or one side of the filler 3 is bonded to the side 1 of the main body of the cell, and the other side of the filler 3 is bonded to the packaging fold 2 .

[0034]

204 Preferably, the filler 3 includes at least one of double-sided adhesive tape, crepe adhesive tape and DuPont adhesive tape, and the use of adhesive tape can make the operation very convenient, and the thickness of the

adhesive tape is better, so that the increased width can be control.

[0035]

210 One side of the filler 3 is bonded to the side 1 of the main body of the cell, and the other side of the filler 3 is in contact with the folded edge 2 of the package.

[0036]

215 One side of the filler 3 is bonded to the package fold 2, and the other side of the filler 3 is in contact with the side 1 of the main body of the cell. The thickness and number of layers of the tape in the widened area 4 can be widened according to the needs of the cell. According to the degree of adjustment, this scheme is easier to operate when pasting the widening area 4, just one step.

[0037]

222 Among them, one side of the filler 3 is bonded to the side 1 of the main body of the cell, and the other side of the filler 3 is bonded to the folded edge 2 of the package, and the filler 3 is arranged between the side 1 of the main body of the cell and the folded edge 2 of the package. In between, the filler 3 is located at the corner of the side 1 of the main body of the battery cell and the corner of the package hem 2. After folding the package hem 2, the widening area 4 can have a double-widening effect. This scheme requires two times to paste the widening area 4. step, but after folding, the side 1 of the main body of the cell and the folded edge 2 of the package can be effectively bonded, and the widened area 4 is filled with double-sided adhesive tape. At this time, the width of the cell is equal to the width of the main body of the cell plus the folded edge 2 of the package The thickness itself, plus the thickness of the widened region 4.

[0038]

234 Preferably, the length of the packaging fold 2 is greater than 1.5mm.

[0039]

238 More preferably, the length of the sealing edge 2 is greater than 3mm.

[0040]

242 The folded height of the packaging folded edge 2 is less than or equal to the height of the side edge 1 of the main body of the battery cell.

[0041]

247 The folded height of the packaging folded edge 2 is greater than the height of the side edge 1 of the main body

of the battery cell.

[0042]

252 A method for manufacturing a widened structure of a flexible-packaged lithium-ion battery, the steps comprising:

[0043]

257 (1) Detect the width of flexible packaging lithium-ion batteries, and classify narrower batteries according to their width;

[0044]

262 (2) Make the packaging flange 2 of the narrow cell in the unfolded state, and the packaging flange 2 forms an angle of 60 to 120 degrees with the side 1 of the main body of the battery;

[0045]

267 (3) Paste the filler 3 on the packaging edge 2, or on the side 1 of the battery body, or at the corner between the packaging edge 2 and the side 1 of the battery body, according to the degree of widening of the battery cell ;

[0046]

272 (4) Use shaping equipment to fold the package fold 2 so that it is closely attached to the side 1 of the main body of the battery cell. In order to prevent the short circuit of the end face of the package fold, an insulating paper can also be added to seal and protect the end face of the package fold 2.

[0047]

278 Compared with the prior art, the present invention includes at least the following advantages: 1) The thickness and number of layers of adhesive paper in the widening area 4 can be adjusted according to the degree of widening of the battery cell, so that the width of the battery cell can be quantitatively widened, and the increased width Controllable; 2) When the width is found to be ultra-narrow, the widened area 4 is set between the side 1 of the main body of the cell and the folded edge 2 of the package, without affecting the appearance of the cell; 3) The widened area is designed with adhesive tape, which is easy to operate and Convenience and high efficiency; 4) The method of the present invention is simple and practical, and does not require complex equipment.

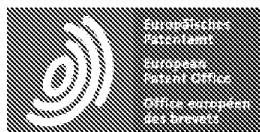
[0048]

289 According to the disclosure and teaching of the above specification, those skilled in the art to which the

present invention pertains can also change and modify the above embodiment.

291 Therefore, the present invention is not limited to the above-mentioned specific implementation manners, and any obvious improvement, substitution or modification made by those skilled in the art on the basis of the present invention shall fall within the protection scope of the present invention.

294 In addition, although some specific terms are used in this specification, these terms are only for convenience of description and do not constitute any limitation to the present invention.



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CLAIMS CN102931368B

1.

¹³ A widened structure of a soft-packed lithium-ion battery, comprising a side (1) of the main body of the battery and packaging folds (2) located on both sides of the side (1) of the main body of the battery, characterized in that: the battery A widened area (4) is provided between the main body side (1) and the package fold (2), and a filler (3) is arranged in the widened area (4), and the filler (3) One side of the battery core body (1) is bonded, one side of the filler (3) is bonded to the packaging fold (2), or one of the fillers (3) One side is bonded to the side (1) of the main body of the cell, and the other side of the filler (3) is bonded to the package hem (2), and the filler (3) includes double-sided adhesive At least one of paper, crepe glued paper and DuPont glued paper.

2.

²⁴ The widening structure of the soft-packed lithium-ion battery according to claim 1, characterized in that: one side of the filler (3) is bonded to the side (1) of the main body of the battery, and the filler (3)) is in contact with the packaging flange (2).

3.

³⁰ The widening structure of flexible packaging lithium-ion batteries according to claim 1, characterized in that: one side of the filler (3) is bonded to the package hem (2), and the filler (3) The other side is in contact with the side (1) of the battery core body.

4.

³⁶ The widened structure of the soft-packaged lithium-ion battery cell according to claim 1, characterized in that: the length of the package folded edge (2) is greater than 1.5mm.

5.

41 The widened structure of the soft-packaged lithium-ion battery cell according to claim 4, characterized in that: the length of the package folded edge (2) is greater than 3mm.

6.

46 The widened structure of the soft-packaged lithium-ion battery cell according to claim 1, characterized in that: the folded height of the packaging fold (2) is less than or equal to the height of the side (1) of the main body of the battery cell.

7.

52 The widened structure of the soft-packaged lithium-ion battery cell according to claim 1, characterized in that: the folded height of the packaging folded edge (2) is greater than the height of the side edge (1) of the battery cell body.

8.

58 A method for making a widened structure of a flexible-packaged lithium-ion battery, characterized in that the steps include:

(1)

63 (1) Detect the width of flexible packaging lithium-ion batteries, and classify narrower batteries according to their width;

(2)

68 (2) Make the package fold (2) of the narrow battery cell in the unfolded state, and the package fold (2) forms an angle of 60 to 120 degrees with the side of the main body of the battery cell (1);

(3)

73 (3) Paste the filler (3) on the package fold (2), or on the side of the battery body (1), or on the package fold (2) and the battery body, according to the extent to which the cell needs to be widened. the corner between the sides (1);

(4)

79 (4) Fold the folded edge (2) of the package with shaping equipment so that it is tightly attached to the side (1)

of the main body of the cell.



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(73) 专利权人 东莞新能源科技有限公司

地址 523808 广东省东莞市松山湖科技产业
园区北部工业园工业西路1号

(72) 发明人 史册

(74) 专利代理机构 天津市北洋有限责任专利代
理事务所 12201

代理人 曹玉平

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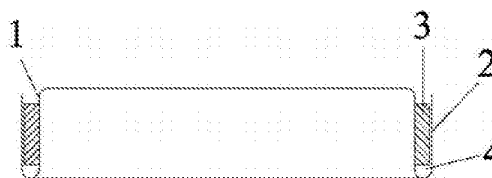
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(54) 发明名称

一种软包装锂离子电池芯加宽结构及其制作方
法

(57) 摘要

本发明属于锂离子电池技术领域,特指一种软包装锂离子电池芯加宽结构及其制作方法,包括电芯主体侧边和位于电芯主体侧边两侧的封装折边,电芯主体侧边和封装折边之间设置有加宽区域,加宽区域内设置有填充物,填充物的其中一侧与电芯主体侧边粘接、填充物的其中一侧与封装折边粘接或填充物的其中一侧与电芯主体侧边粘接,填充物的另一侧与封装折边粘接。该结构设置的加宽区域可使较窄电芯加宽,有效改善电芯宽度一致性,确保电芯在电池中固定,该方法对出货宽度偏窄的电芯,通过在电芯主体侧边与电芯封装折边之间设置加宽区域来使电芯加宽,可作为一种补救措施,从而改善电芯宽度一致性。



1. 一种软包装锂离子电芯加宽结构, 包括电芯主体侧边(1)和位于所述电芯主体侧边(1)两侧的封装折边(2), 其特征在于: 所述电芯主体侧边(1)和所述封装折边(2)之间设置有加宽区域(4), 所述加宽区域(4)内设置有填充物(3), 所述填充物(3)的其中一侧与所述电芯主体侧边(1)粘接、所述填充物(3)的其中一侧与所述封装折边(2)粘接或所述填充物(3)的其中一侧与所述电芯主体侧边(1)粘接, 所述填充物(3)的另一侧与所述封装折边(2)粘接, 所述填充物(3)包括双面胶纸、皱纹胶纸和杜邦胶纸中的至少一种。

2. 根据权利要求1所述的软包装锂离子电芯加宽结构, 其特征在于: 所述填充物(3)的一侧与所述电芯主体侧边(1)粘接, 所述填充物(3)的另一侧与所述封装折边(2)接触。

3. 根据权利要求1所述的软包装锂离子电芯加宽结构, 其特征在于: 所述填充物(3)的一侧与所述封装折边(2)粘接, 所述填充物(3)的另一侧与所述电芯主体侧边(1)接触。

4. 根据权利要求1所述的软包装锂离子电芯加宽结构, 其特征在于: 所述封装折边(2)的长度大于1.5mm。

5. 根据权利要求4所述的软包装锂离子电芯加宽结构, 其特征在于: 所述封装折边(2)的长度大于3mm。

6. 根据权利要求1所述的软包装锂离子电芯加宽结构, 其特征在于: 所述封装折边(2)折叠后的高度小于或等于所述电芯主体侧边(1)的高度。

7. 根据权利要求1所述的软包装锂离子电芯加宽结构, 其特征在于: 所述封装折边(2)折叠后的高度大于所述电芯主体侧边(1)的高度。

8. 一种软包装锂离子电芯加宽结构的制作方法, 其特征在于, 步骤包括:

(1)检测软包装锂离子电芯宽度, 将偏窄电芯按照宽度分类;

(2)使偏窄电芯的封装折边(2)处于展开状态, 封装折边(2)与电芯主体侧边(1)成60~120度的夹角;

(3)根据电芯需要加宽的程度, 将填充物(3)粘贴于封装折边(2)上, 或者电芯主体侧边(1)上, 或者封装折边(2)与电芯主体侧边(1)之间的拐角处;

(4)采用整型设备将封装折边(2)折叠, 使之与电芯主体侧边(1)贴紧。

一种软包装锂离子电芯加宽结构及其制作方法

技术领域

[0001] 本发明属于锂离子电池技术领域,特指一种软包装锂离子电芯加宽结构及其制作方法。

背景技术

[0002] 锂离子电池作为一种环保的二次电池,已经在便携式设备如手机、摄像机、笔记本电脑等领域得到了广泛的应用。

[0003] 软包装锂离子电芯通常是卷绕结构,由于正极片、负极片、隔离膜的厚度波动,以及卷绕张力的不同,导致卷绕出来的电芯宽度一致性较差,在电芯组装电池(Pack)时,宽度较小的电芯很难在Pack中良好固定,将导致潜在的电接触不良及安全问题。

[0004] 目前Pack主要有两种加工方法:一种是电芯装入固定尺寸的胶框中,然后外部加一圈包装纸(A-Pack);另一种是电芯直接用具有一定强度的铝箔(约1.0mm厚)沿着宽度方向卷绕一周,然后装配顶盖和底盖,最后外部加一圈包装纸(B-Pack)。为了改善较窄电芯在Pack中的固定,针对A-Pack,在电芯装入胶框中之后,通常在电芯两侧与胶框间空隙处注入热熔胶,以此来改善电芯与Pack固定。然而,随着工序生产向自动化发展,自动注胶量将一定,这就导致热熔胶并不能有效填充较窄电芯与胶框间空隙,两者固定不牢的现象再次出现。而针对B-Pack,目前行业内还没有比较好的改善电芯在Pack中的固定方法。

[0005] 如图1所示,现有技术折边后电芯结构示意图,封装折边2整形后与电芯主体侧边1贴紧。电芯宽度等于电芯主体宽度加上封装折边2本身厚度。

发明内容

[0006] 本发明的目的在于:针对现有技术的不足,而提供一种软包装锂离子电芯加宽结构及其制作方法。该结构可有效改善软包装锂离子电芯宽度一致性,确保电芯在电池中固定,该方法对出货宽度偏窄的电芯,通过在电芯主体侧边与电芯封装折边之间设置加宽区域来使电芯加宽,可作为一种补救措施,从而改善电芯宽度一致性。

[0007] 为实现上述目的,本发明提供一种软包装锂离子电芯加宽结构,该技术方案如下:一种软包装锂离子电芯加宽结构,包括电芯主体侧边和位于所述电芯主体侧边两侧的封装折边,所述电芯主体侧边和所述封装折边之间设置有加宽区域,所述加宽区域内设置有填充物,所述填充物的其中一侧与所述电芯主体侧边粘接、所述填充物的其中一侧与所述封装折边粘接或所述填充物的其中一侧与所述电芯主体侧边粘接,所述填充物的另一侧与所述封装折边粘接。

[0008] 所述填充物包括双面胶纸、皱纹胶纸和杜邦胶纸中的至少一种。

[0009] 所述填充物的一侧与所述电芯主体侧边粘接,所述填充物的另一侧与所述封装折边接触。

[0010] 所述填充物的一侧与所述封装折边粘接,所述填充物的另一侧与所述电芯主体侧边接触。

- [0011] 所述封装折边的长度大于1.5mm。
- [0012] 所述封装折边的长度大于3mm。
- [0013] 所述封装折边折叠后的高度小于或等于所述电芯主体侧边的高度。
- [0014] 所述封装折边折叠后的高度大于所述电芯主体侧边的高度。
- [0015] 本发明还提供一种软包装锂离子电芯加宽结构的制作方法,步骤包括:
- [0016] (1)检测软包装锂离子电芯宽度,将偏窄电芯按照宽度分类;
- [0017] (2)使偏窄电芯的封装折边处于展开状态,封装折边与电芯主体侧边成60~120度的夹角;
- [0018] (3)根据电芯需要加宽的程度,将填充物粘贴于封装折边上,或者电芯主体侧边上,或者封装折边与电芯主体侧边之间的拐角处;
- [0019] (4)采用整型设备将封装折边折叠,使之与电芯主体侧边贴紧。
- [0020] 本发明的有益效果在于:本发明提供一种软包装锂离子电芯加宽结构及其制作方法。该结构的加宽区域内设置的填充物可使较窄电芯加宽,有效改善电芯宽度一致性,确保电芯在电池中固定,该方法对出货宽度偏窄的电芯,通过在电芯主体侧边与电芯封装折边之间设置的加宽区域来使电芯加宽,可作为一种补救措施,从而改善电芯宽度一致性。

附图说明

- [0021] 图1为现有技术的结构示意图。
- [0022] 图2为本发明折边前电芯结构示意图。
- [0023] 图3为本发明加宽区域设置于电芯主体侧边和封装折边拐角处的电芯示意图。
- [0024] 图4为本发明加宽区域设置于电芯主体侧边上的电芯示意图。
- [0025] 图5为本发明加宽区域设置于封装折边上的电芯示意图。
- [0026] 图6为本发明折边后电芯加宽结构侧视图。

具体实施方式

- [0027] 下面结合实施例和说明书附图,对本发明作进一步详细的描述,但本发明的实施方式不限于此。
- [0028] 如图2~6所示,一种软包装锂离子电芯加宽结构,包括电芯主体侧边1和位于电芯主体侧边1两侧的封装折边2,电芯主体侧边1和封装折边2之间设置有加宽区域4,加宽区域4内设置有填充物3,填充物3的其中一侧与电芯主体侧边1粘接、填充物3的其中一侧与封装折边2粘接或填充物3的其中一侧与电芯主体侧边1粘接,填充物3的另一侧与封装折边2粘接。
- [0029] 优选的,填充物3包括双面胶纸、皱纹胶纸和杜邦胶纸中的至少一种,采用胶纸可以使操作非常方便,并且胶纸的厚度一致性较好,从而使增加的宽度可控。
- [0030] 填充物3的一侧与电芯主体侧边1粘接,填充物3的另一侧与封装折边2接触。
- [0031] 填充物3的一侧与封装折边2粘接,填充物3的另一侧与电芯主体侧边1接触,加宽区域4的胶纸的厚度及层数可根据电芯需要加宽的程度而调整,此方案粘贴加宽区域4时较易操作,一步即可。
- [0032] 其中,填充物3的一侧与电芯主体侧边1粘接,填充物3的另一侧与封装折边2粘接,

填充物3设置于电芯主体侧边1和封装折边2之间,填充物3位于电芯主体侧边1和封装折边2的拐角处,折叠封装折边2之后加宽区域4可以有双倍加宽的效果,此方案粘贴加宽区域4时需要两步,但折边后电芯主体侧边1和封装折边2可有效粘接,此加宽区域4填充为双面胶纸,此时电芯宽度等于电芯主体宽度加上封装折边2本身厚度,在加上加宽区域4的厚度。

[0033] 优选的,封装折边2的长度大于1.5mm。

[0034] 更优选的,封装折边2的长度大于3mm。

[0035] 封装折边2折叠后的高度小于或等于电芯主体侧边1的高度。

[0036] 封装折边2折叠后的高度大于电芯主体侧边1的高度。

[0037] 一种软包装锂离子电芯加宽结构的制作方法,步骤包括:

[0038] (1)检测软包装锂离子电芯宽度,将偏窄电芯按照宽度分类;

[0039] (2)使偏窄电芯的封装折边2处于展开状态,封装折边2与电芯主体侧边1成60~120度的夹角;

[0040] (3)根据电芯需要加宽的程度,将填充物3粘贴于封装折边2上,或者电芯主体侧边1上,或者封装折边2与电芯主体侧边1之间的拐角处;

[0041] (4)采用整型设备将封装折边2折叠,使之与电芯主体侧边1贴紧,为防止封装折边端面短路,也可附加绝缘纸将封装折边2端面封闭保护。

[0042] 相对于现有技术,本发明至少包括如下优点:1)加宽区域4胶纸的厚度及层数可根据电芯需要加宽的程度而调整,从而可定量加宽电芯宽度,增加的宽度可控;2)发现宽度超窄后,加宽区域4设置在电芯主体侧边1与封装折边2之间,不影响电芯外观;3)加宽区域采用胶纸设计,操作简单、方便和效率高;4)本发明的方法简单实用,不需要复杂的设备。

[0043] 根据上述说明书的揭示和教导,本发明所属领域的技术人员还能够对上述实施方式变更和修改。因此,本发明并不局限于上述的具体实施方式,凡是本领域技术人员在本发明的基础上所作出的任何显而易见的改进、替换或变型均属于本发明的保护范围。此外,尽管本说明书中使用了一些特定的术语,但这些术语只是为了方便说明,并不对本发明构成任何限制。

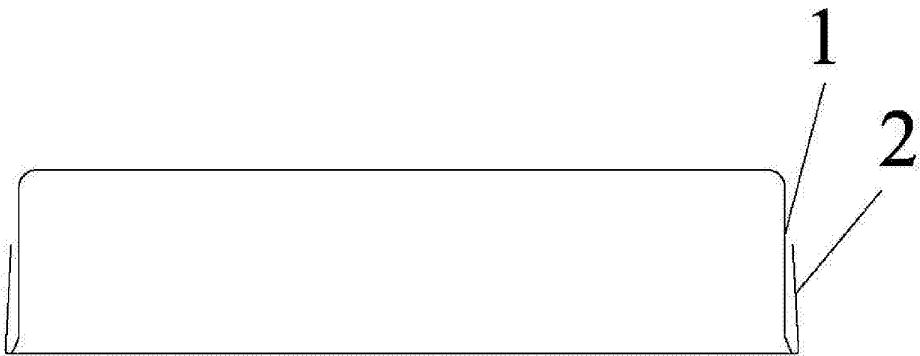


图1

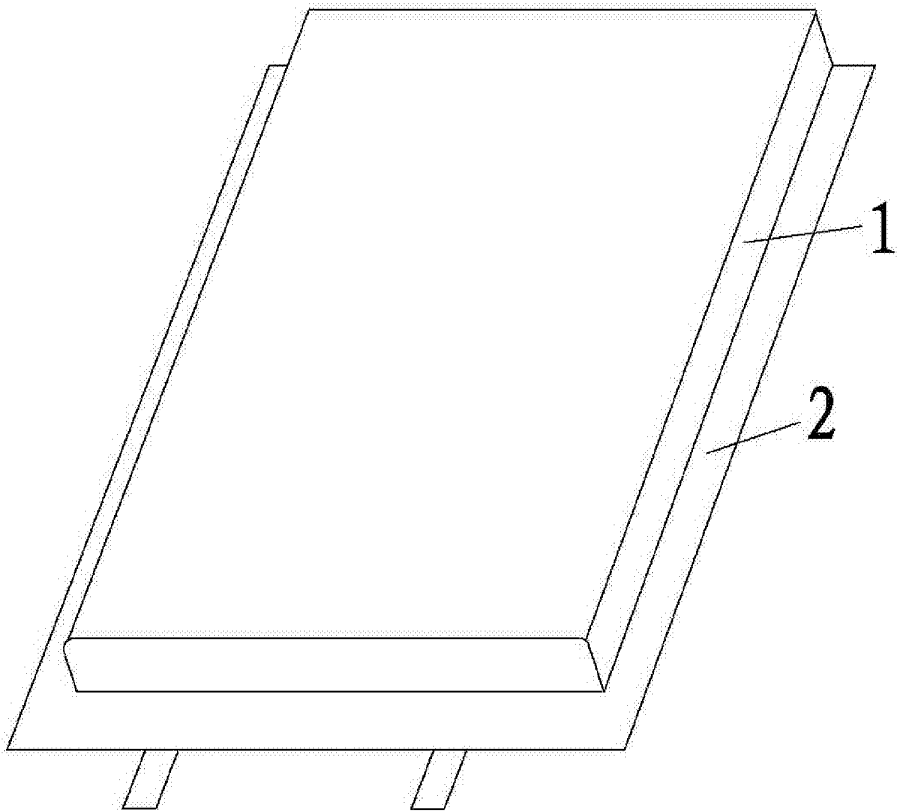


图2

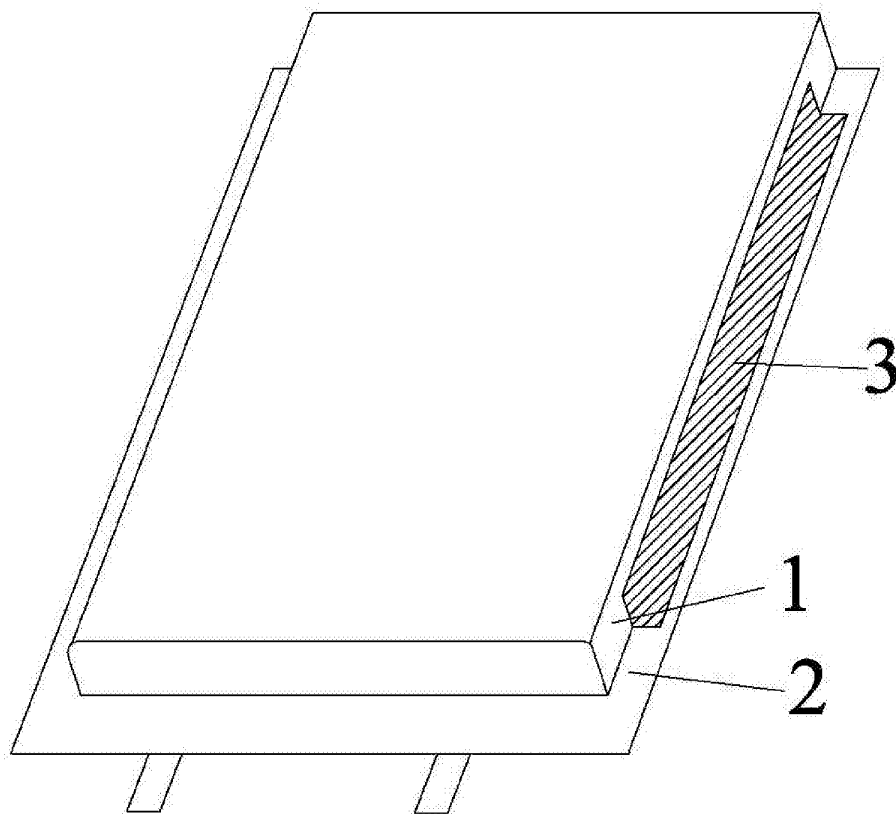


图3

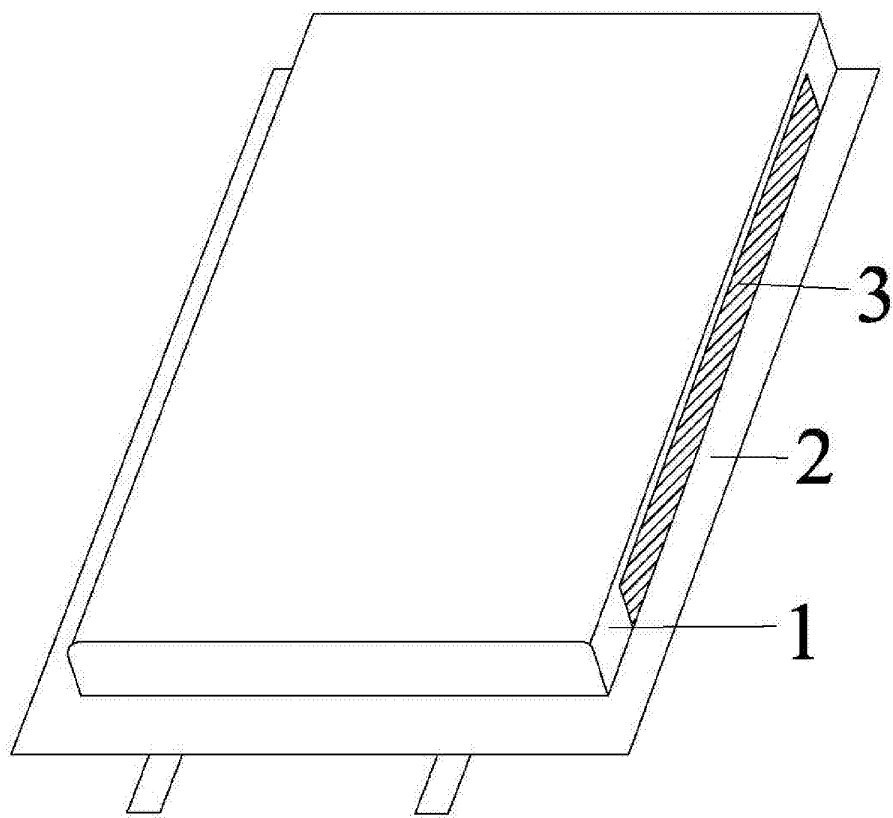


图4

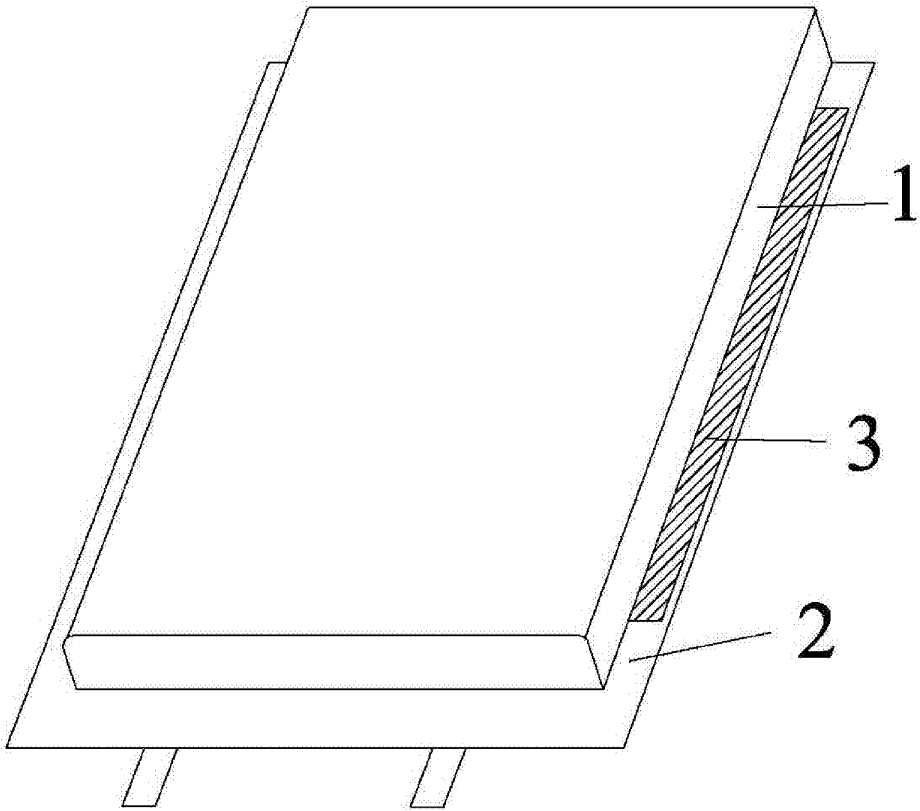


图5



图6



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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
17/374,803

RECEIPT DATE / TIME
05/24/2023 07:59:03 PM ET

ATTORNEY DOCKET #
024607-02-5110-US

Title of Invention

BATTERY

Application Information

APPLICATION TYPE Utility - Nonprovisional Application
under 35 USC 111(a)

PATENT # -

CONFIRMATION # 5191

FILED BY Jackeline De Ranieri

PATENT CENTER # 62150915

FILING DATE 07/13/2021

CUSTOMER # 24341

FIRST NAMED
INVENTOR Bolin Zhou

CORRESPONDENCE
ADDRESS -

AUTHORIZED BY Yalei Sun

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
024607-02-5110-US Information Disclosure Statement under 37 cfr 1.97i 24MAY2023.pdf	4	Transmittal Letter	125 KB
024607-02-5110-US List of References Form 1449 24MAY2023.pdf	1	Information Disclosure Statement (IDS) Form (SB08)	103 KB
Warning: This is not a USPTO supplied IDS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.			
CN102931368B.pdf	21	Foreign Reference	848 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
024607-02-5110-US Information Disclosure Statement under 37 cfr 1.97i 24MAY2023.pdf	49716D54A16E8ED626EFCDBCA5FB2B7EEC6F4FB366A9892A BAFEABB231E567E686B0FDA29D89284A8222C7D43509C4217 7BC30675AFD620A595B4F73ACB64542
024607-02-5110-US List of References Form 1449 24MAY2023.pdf	1A35F9008CE578A567722B3D48683A5ACA0B37E067F63337F5 83F0FFCCB10BBA583AB9748BCD8002038A680CC828FB6FA8 A22D06F758C692946F40327FBD19FB
CN102931368B.pdf	28DF0B20010E15A4D0FBB8E4543ED06D4B5B533C5C11C1DC C4A55500AF28877B8FC228668708EE40AB3EDBA776712122C CCF64AC88A136236AF77ED37986FB01

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 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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NOTICE OF ALLOWANCE AND FEE(S) DUE

24341 7590 03/01/2023
Morgan, Lewis & Bockius LLP (PA)
1400 Page Mill Road
Palo Alto, CA 94304-1124

EXAMINER

SHEIKH, HAROON S

ART UNIT PAPER NUMBER

1724

DATE MAILED: 03/01/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/374,803	07/13/2021	Bolin Zhou	024607-02-5110-US	5191

TITLE OF INVENTION: BATTERY

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	06/01/2023

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 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted 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. 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: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (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)

24341 7590 03/01/2023
Morgan, Lewis & Bockius LLP (PA)
1400 Page Mill Road
Palo Alto, CA 94304-1124

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 transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/374,803	07/13/2021	Bolin Zhou	024607-02-5110-US	5191

TITLE OF INVENTION: BATTERY

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	06/01/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHEIKH, HAROON S	1724	429-096000

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/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or 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 must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). 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. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

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. _____



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/374,803	07/13/2021	Bolin Zhou	024607-02-5110-US	5191
24341	7590	03/01/2023	EXAMINER	
Morgan, Lewis & Bockius LLP (PA)			SHEIKH, HAROON S	
1400 Page Mill Road			ART UNIT	
Palo Alto, CA 94304-1124			PAPER NUMBER	

1724

DATE MAILED: 03/01/2023

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 30 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. 17/374,803	Applicant(s) Zhou, Bolin	
	Examiner HAROON S SHEIKH	Art Unit 1724	AIA (FITF) Status Yes

-- 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 amendments filed 11/29/2022.
☐ 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 1-19 and 21-28. 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 a reply 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)	5. ☐ Examiner's Amendment/Comment
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____.	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material ____.	7. ☐ Other ____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date ____.	

/Haroon S. Sheikh/ Primary Examiner, Art Unit 1724	
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DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Status of Application

Applicant's arguments, see pp. 6-9, filed 11/29/2022, with respect to amended claim 1 have been fully considered and are persuasive. The 35 U.S.C. 102 and 35 U.S.C. 103 rejections in the previous Office Action are withdrawn. The previous provisional non-statutory obvious-type double patenting rejection of the outstanding claims is withdrawn in light of the amendments to claim 1.

The application is in condition for allowance. See Reasons for Allowance.

Reasons for Allowance

Claims 1-19 and 21-28 are allowed.

The following is an examiner's statement of reasons for allowance: the claimed battery is novel over the closest prior art – **Kim (KR100670438Ba; foreign copy and machine translation on record), Kim2 (US 2009/0023058 A1), Ariga (US 2014/0212717 A1) and Lee (US 2014/0356672 A1).**

Regarding **Claim 1**, the cited prior art discloses all aspects of the claimed invention except for the feature of the second part being adhered to the curved side face of the electrode body via an adhesive layer. In particular, the cited references disclose covering the side face of the electrode body with the second part by merely folding the second part but fail to explicitly teach provision of an adhesive layer (or similar material) to adhere the second part to the side face of the electrode body. The instant application teaches that providing adhering the second part to the curved side surface by an adhesive layer ensures a fit between each portion of the second part and the electrode body to further prevent the opening of the flange portion during transportation, use, or placement.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HAROON S SHEIKH whose telephone number is (571)270-0302. The examiner can normally be reached 9-5.

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, MIRIAM STAGG can be reached on (571) 270-5256. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HAROON S. SHEIKH
Examiner
Art Unit 1724

/Haroon S. Sheikh/
Primary Examiner, Art Unit 1724

<i>Notice of References Cited</i>	Application/Control No. 17/374,803		Applicant(s)/Patent Under Reexamination Zhou, Bolin	
	Examiner HAROON S SHEIKH		Art Unit 1724	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20140212717-A1	07-2014	Ariga; Toshiyuki	H01M50/477	429/94
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	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.

<i>Search Notes</i> 	Application/Control No. 17/374,803	Applicant(s)/Patent Under Reexamination Zhou, Bolin
	Examiner HAROON S SHEIKH	Art Unit 1724

CPC - Searched*		
Symbol	Date	Examiner
h01m50	08/27/2022	hs
h01m10	08/27/2022	hs

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

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

Search Notes		
Search Notes	Date	Examiner
h01m50	08/27/2022	hs
h01m10	08/27/2022	hs
Inventor/Assignee search	08/27/2022	hs
Forward/Backward Citation search	08/27/2022	hs
UPDATED Classification search	02/23/2023	hs
UPDATED Forward/Backward Citation search	02/23/2023	hs

/Haroon S. Sheikh/ Primary Examiner, Art Unit 1724	
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<i>Search Notes</i> 	Application/Control No. 17/374,803	Applicant(s)/Patent Under Reexamination Zhou, Bolin
	Examiner HAROON S SHEIKH	Art Unit 1724

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
h01m50		02/23/2023	hs
h01m10		02/23/2023	hs

/Haroon S. Sheikh/ Primary Examiner, Art Unit 1724	
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Issue Classification 	Application/Control No. 17/374,803	Applicant(s)/Patent Under Reexamination Zhou, Bolin
	Examiner HAROON S SHEIKH	Art Unit 1724

CPC						
Symbol					Type	Version
H01M	/	10	/	0525	F	2013-01-01
H01M	/	10	/	0436	I	2013-01-01
H01M	/	50	/	24	I	2021-01-01
H01M	/	50	/	107	I	2021-01-01
H01M	/	50	/	184	I	2021-01-01

CPC Combination Sets							
Symbol				Type	Set	Ranking	Version
	/		/				

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	27	
/Haroon S. Sheikh/ Primary Examiner, Art Unit 1724	23 February 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification 	Application/Control No. 17/374,803	Applicant(s)/Patent Under Reexamination Zhou, Bolin
	Examiner HAROON S SHEIKH	Art Unit 1724

INTERNATIONAL CLASSIFICATION				
CLAIMED				
H01M10/0525	/	10	/	0525
H01M10/04	/	10	/	04
H01M50/24	/	50	/	24
H01M50/107	/	50	/	107
H01M50/184	/	50	/	184
NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

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

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	27	
/Haroon S. Sheikh/ Primary Examiner, Art Unit 1724	23 February 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification 	Application/Control No. 17/374,803	Applicant(s)/Patent Under Reexamination Zhou, Bolin
	Examiner HAROON S SHEIKH	Art Unit 1724

☐ 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	10	19	19										
2	2	11	11	20	21										
3	3	12	12	21	23										
4	4	13	13	22	24										
5	5	14	14	23	22										
6	6	15	15	24	26										
7	7	16	16	25	27										
8	8	17	17	26	25										
9	9	18	18	27	28										

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 27	
/Haroon S. Sheikh/ Primary Examiner, Art Unit 1724 (Primary Examiner) _____ (Date) _____		23 February 2023 O.G. Print Claim(s) 1	O.G. Print Figure 1

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				Electronically filed August 29, 2022		
				Application Number	17/374,803	
				Filing Date	July 13, 2021	
				First Named Inventor	Bolin ZHOU	
				Art Unit	1724	
Examiner Name	Haroon S Sheikh					
Sheet	1	of	1	Attorney Docket Number	024607-02-5110-US	

U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	Document Number Number - Kind Code	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	
		20170005300 A1	01-05-2017	Kodama		
FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document Country Code - Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T
NON PATENT LITERATURE DOCUMENTS						
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, page(s), volume-issue number(s), publisher, city and/or country where published				
		Zhou, Office Action, US16/166,142, 09DEC2020, 9 pgs.				
		Zhou, Notice of Allowance, US16/166,142, 14AR2021, 8 pgs.				

Examiner Signature	/Haroon S. Sheikh/	Date Considered	02/23/2023
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DB2/ 43952120.1

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	86875	((("ZHOU") near3 ("Bolin"))).INV. (((("NINGDE") near3 ("AMPEREX") near3 ("TECHNOLOGY") near3 ("LIMITED")))).AS,AAN M.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:13 PM
L2	1070716	h01m50\$.cpc. h01m10\$.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:14 PM
L3	4066	1 AND 2	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:14 PM
L4	4064	3 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT,	OR	ON	ON	2022/08/27 08:14 PM

			JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L5	341	4 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:14 PM
L6	52800	2 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:16 PM
L7	13061	2 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))) near4 (end distal side) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:16 PM
L8	820	2 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2022/08/27 08:16 PM

		(cell device store storing produc\$3 generat\$3 battery cell))) near4 (end distal side) WITH (flange rib) near3 (member portion part segment piece structure) WITH (protrusion protrud\$3 project\$3)	CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L9	258279	2 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell))) near4 (end distal side edge corner)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:17 PM
L10	41364	9 AND (end distal side edge corner) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:17 PM
L11	30379	2 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell))) WITH (end distal side edge corner) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:17 PM
L12	25456	10 AND (battery cell	(US-PGPUB; USPAT;	OR	ON	ON	2022/08/27

		accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell))) WITH (end distal side edge corner) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				08:18 PM
L13	13060	9 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3) ADJ (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:18 PM
L14	5934	10 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell))) WITH (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3) ADJ (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:18 PM
L15	407	14 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3) ADJ (member portion part segment piece structure) WITH (curved curvature radius circle circular semi\$1circle semi\$1circular)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO);	OR	ON	ON	2022/08/27 08:18 PM

L16	110	15 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3) ADJ (member portion part segment piece structure) WITH (seal\$3)	FPRS; EPO; JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:18 PM
L17	18	15 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3) ADJ (member portion part segment piece structure) WITH (glue ((seal\$3 bond\$3 adhesi\$2) near2 (layer film tape)))	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/02/23 12:45 AM
L18	18	15 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3) ADJ2 (member portion part segment piece structure) WITH (glue ((seal\$3 bond\$3 adhesi\$2) near2 (layer film tape)))	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/02/23 12:45 AM
L19	6846	10 AND (battery cell accumulator ((energy electro\$1 chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell))) WITH (end distal side edge corner) near4 (flange rib protrusion	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT,	OR	ON	ON	2023/02/23 12:46 AM

		protrud\$3 project\$3 wing tip) ADJ (member portion part segment piece structure)	RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L20	221	19 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3 wing tip) ADJ2 (member portion part segment piece structure) WITH (glue ((seal\$3 bond\$3 adhesi\$2) near2 (layer film tape)))	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/02/23 12:47 AM
L21	29	20 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3 wing tip) ADJ (member portion part segment piece structure) WITH (curved curvature radius circle circular semi\$1circle semi\$1circular)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/02/23 12:47 AM
L22	47254	9 AND (end distal side edge corner) WITH (flange rib protrusion protrud\$3 project\$3 tip wing) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/02/23 12:52 AM
L23	7341	22 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT,	OR	ON	ON	2023/02/23 12:52 AM

		WITH (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3 wing tip) ADJ (member portion part segment piece structure)	JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L24	236	23 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3 wing tip) ADJ2 (member portion part segment piece structure) WITH (glue ((seal\$3 bond\$3 adhesi\$2) near2 (layer film tape)))	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/02/23 12:52 AM
L25	32	24 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3 wing tip) ADJ (member portion part segment piece structure) WITH (curved curvature radius circle circular semi\$1circle semi\$1circular)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/02/23 12:53 AM
L26	3	25 NOT 21	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/02/23 12:53 AM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default	Plurals	British	Time Stamp
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02/23/2023 01:01:45 AM
Workspace: 17374803

Page 7 of 9
HS

				Operator		Equivalents	
N1	133967	h01m50\$.cpc. h01m10\$.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/23 12:51 AM
N2	42785	1 AND ((battery cell accumulator ((energy electro\$1 chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))) SAME (end distal side edge corner)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/23 12:56 AM
N3	4758	2 AND ((end distal side edge corner) WITH (flange rib protrusion protrud\$3 project\$3 tip wing) near3 (member portion part segment piece structure)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/23 12:56 AM
N4	1921	3 AND ((battery cell accumulator ((energy electro\$1 chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))) SAME (end distal side edge corner) WITH (flange rib protrusion protrud\$3 project\$3 wing tip) ADJ2 (member portion part segment piece structure)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/23 12:57 AM
N5	10	4 AND ((end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3 wing tip) ADJ2 (member portion part segment piece structure) SAME (glue ((seal\$3 bond\$3 adhesi\$2) near2 (layer film tape))))).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/23 12:57 AM
N6	2087	3 AND ((end distal side edge corner) WITH (flange rib protrusion protrud\$3 project\$3 wing tip) ADJ2 (member portion part segment piece structure)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/23 12:59 AM
N7	10	6 AND ((end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3 wing tip) ADJ2 (member portion part segment	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/23 12:59 AM

		piece structure) SAME (glue ((seal\$3 bond\$3 adhesi\$2) near2 (layer film tape))))).clm.					
N8	37	6 AND ((flange rib protrusion protrud\$3 project\$3 wing tip) ADJ2 (member portion part segment piece structure) SAME (glue ((seal\$3 bond\$3 adhesi\$2) near2 (layer film tape))))).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/23 12:59 AM
N9	27	8 NOT 7	(US-PGPUB; USPAT)	OR	ON	ON	2023/02/23 01:00 AM

Electronically filed November 29, 2022

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Bolin Zhou	Confirmation No.:	5191
Serial No.:	17/374,803	Art Unit:	1724
Filed:	July 13, 2021	Examiner:	Sheikh, Haroon S.
For:	<i>Battery</i>	Attorney Docket No.:	024607-02-5110-US

AMENDMENT AND RESPONSE TO NON-FINAL OFFICE ACTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The enclosed Amendment is in response to the Office Action dated September 2, 2022 for the above-identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 024607-02-5110-US).

Amendments to the Claims

The following listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A battery, comprising:
an electrode body, and
a package, wherein the package comprises:
a first part covering a second plane of the electrode body;[[.]] and
a second part protruding from the first part in a [[first]] width direction of the electrode body, wherein the second part comprises a curved ~~portion~~ structure, the curved structure curves around a curved side face of the electrode body in a thickness direction perpendicular to the width direction, the second part including a first end connected to the first part and a second end opposite to the first end in the thickness direction, and the second part is adhered to the curved side face of the electrode body via an adhesive layer.
2. (Currently Amended) The battery according to claim 1, wherein a projection of the first part in the [[first]] width direction overlaps with a projection of the second part in the [[first]] width direction.
3. (Currently Amended) The battery according to claim 2, wherein the projection of the second part in the [[first]] width direction is located within the projection of the first part in the [[first]] width direction.
4. (Currently Amended) The battery according to claim 2, wherein a projection of the first part in ~~a second~~ the thickness direction overlaps with a projection of the second part in the ~~second~~ thickness direction, ~~the second direction being perpendicular to the first direction.~~
5. (Currently Amended) The battery according to claim 1, wherein the first part comprises:
a first surface extending in the [[first]] width direction;
a second surface extending in the [[first]] width direction, wherein the second surface is opposite to the first surface in ~~a second~~ the thickness direction, ~~the second direction being perpendicular to the first direction;~~ and

~~the curved side face connects a first side surface connecting~~ the first surface and the second surface.

6. (Currently Amended) The battery according to claim 5,
wherein the second part comprises a first region comprising the curved structure
~~portion~~, wherein the first region is connected to the first part.
7. (Currently Amended) The battery according to claim 6, wherein a projection of the first region in the ~~second~~ thickness direction overlaps with a projection of the first part in the thickness ~~second~~ direction.
8. (Original) The battery according to claim 6, wherein the second part further comprises a second region, and a folded portion connecting the first region and the second region.
9. (Currently Amended) The battery according to claim 8, wherein a projection of the folded portion in the ~~second~~ thickness direction is located within a projection of the first region in the ~~second~~ thickness direction.
10. (Currently Amended) The battery according to claim 8, wherein projection of the second region in the ~~second~~ thickness direction is located within a projection of the first region in the ~~second~~ thickness direction.
11. (Currently Amended) The battery according to claim 8, wherein a projection of the folded portion in the ~~second~~ thickness direction and a projection of the second region in the ~~second~~ thickness direction are located within projection of the first region in the ~~second~~ thickness direction.
12. (Currently Amended) The battery according to claim 8, wherein a projection of the first region in the ~~[[first]]~~ width direction is located within a projection of the first part in the ~~[[first]]~~ width direction.
13. (Currently Amended) The battery according to claim 8, wherein a projection of the folded portion in the ~~[[first]]~~ width direction is located within a projection of the first part in the ~~[[first]]~~ width direction.

14. (Currently Amended) The battery according to claim 8, wherein a projection of the second region in the [[first]] width direction is located within a projection of the first part in the [[first]] width direction.

15. (Currently Amended) The battery according to claim 8, wherein a projection of the first region in the [[first]] width direction and a projection of the folded portion in the [[first]] width direction are located within a projection of the first part in the [[first]] width direction.

16. (Currently Amended) The battery according to claim 8, wherein a projection of the first region in the [[first]] width direction and a projection of the second region in the [[first]] width direction are located within a projection of the first part in the [[first]] width direction.

17. (Currently Amended) The battery according to claim 8, wherein a projection of the folded portion in the [[first]] width direction and a projection of the second region in the [[first]] width direction are located within a projection of the first part in the [[first]] width direction.

18. (Currently Amended) The battery according to claim 8, wherein a projection of the first region in the [[first]] width direction, a projection of the folded portion in the [[first]] width direction, and a projection of the second region in the [[first]] width direction are located within a projection of the first part in the [[first]] width direction.

19. (Currently Amended) The battery according to claim 8,
wherein the second region comprises a first end portion connected to the folded portion, and a second end portion opposite to the first end portion, and
wherein a projection of the second end portion in the [[first]] width direction is located between a central plane of the first part and a projection of the first surface in the [[first]] width direction.

20. (Canceled)

21. (Currently Amended) The battery according to claim [[20]] 8, wherein the adhesive layer is provided between the curved side face ~~first side surface~~ and the second region in the [[first]] width direction.

22. (Currently Amended) The battery according to claim [[20]] 6, wherein the adhesive layer is provided between the curved side face ~~first side surface~~ and the first region in the [[first]] width direction.
23. (Currently Amended) The battery according to claim [[20]] 8, wherein the adhesive layer is provided between the first region and the second region in the [[first]] width direction.
24. (Currently Amended) The battery according to claim [[20]] 8, wherein the adhesive layer is provided between the curved side face ~~first side surface~~, the first region and the second region in the [[first]] width direction.
25. (Currently Amended) The battery according to claim [[20]] 1, wherein a unit mass of the adhesive layer is 0.1 to 0.25 mg/mm in the thickness ~~second~~ direction.
26. (Currently Amended) The battery according to claim 5, wherein at least one of the first surface or the second surface has a flat region in the [[first]] width direction.
27. (Currently Amended) The battery according to claim 5,
wherein the curved side face ~~first side surface~~ faces to the second part in the [[first]] width direction.
28. (Currently Amended) The battery according to claim [[5]] 1, wherein the curved side face ~~first side surface~~ protrudes toward the second part in the [[first]] width direction.

REMARKS

This amendment responds to the office action mailed September 2, 2022. In the office action, the Examiner:

- rejected claims 1-7 and 26-28 under 35 U.S.C. 102(a)(1)/102(a)(2) as being anticipated by Kim et al. (KR 100670438B1, foreign copy and machine translation);
- rejected claims 8-25 under 35 U.S.C. 103 as being unpatentable over Kim, as applied to claim 5 above, and further in view of Ariga et al. (US 2014/0212717 A1); and
- rejected claims 1-28 on the ground of nonstatutory double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 11,094,992 B2.

REMARKS CONCERNING CLAIMS

Claims 1-7, 9-19 and 21-28 have been amended. Support for the amendments can be found in at least claim 20 as originally filed, and paragraphs 11, 12, 24, and 25, and Figure 1 of the application as filed. No new matter has been added.

Claim 20 has been canceled.

With respect to all amendments, Applicant has not dedicated or abandoned any unclaimed subject matter. Moreover, Applicant has not acquiesced to any characterizations of the invention, nor any rejections or objections of the claims, made by the Examiner. Moreover, the Applicant hereby rescinds any prior disclaimer of claim scope, to the extent they exist, made during the prosecution of this application or made during the prosecution of any patent or other related patents/applications, and advises the Examiner that any such previous disclaimers and the cited references that they were made to avoid may need to be revisited.

After entry of this amendment, the pending claims are: claims 1-19 and 21-28.

REMARKS CONCERNING REJECTIONS UNDER 35 U.S.C. 102

I. REJECTION OF CLAIMS 1-7 AND 26-28 UNDER 35 U.S.C. 102A(1)/102A(2) AS BEING ANTICIPATED BY KIM

As amended, claim 1 recites:

A battery, comprising:
an electrode body, and

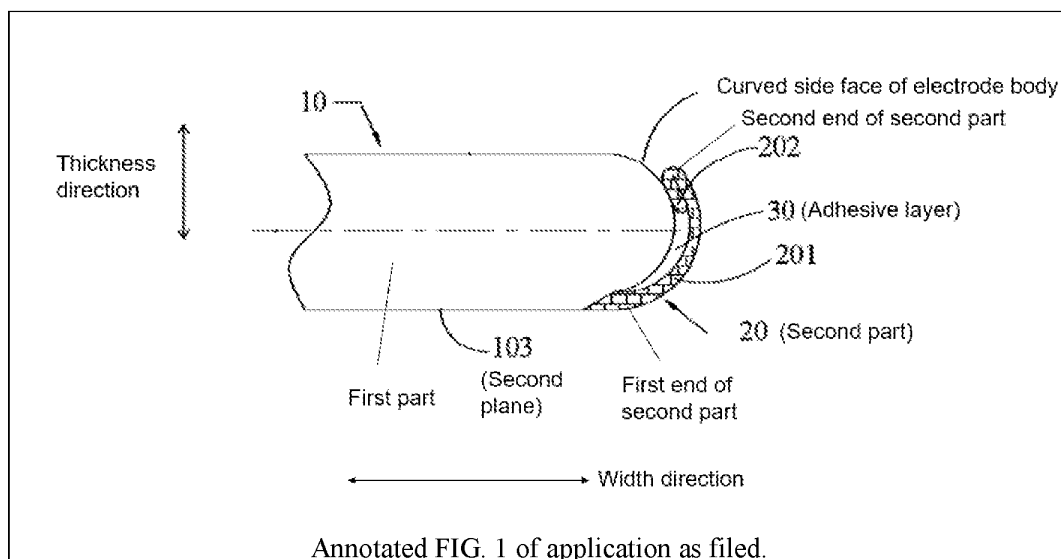
a package, wherein the package comprises:

a first part covering a second plane of the electrode body; and

a second part protruding from the first part in a width direction of the electrode body, wherein **the second part comprises a curved structure, the curved structure curves around a curved side face of the electrode body in a thickness direction perpendicular to the width direction, the second part including a first end connected to the first part and a second end opposite to the first end in the thickness direction, and the second part is adhered to the curved side face of the electrode body via an adhesive layer.**

Emphasis Added.

Support for amended claim 1 can be found in at least FIG. 1 of the application as filed. Annotated FIG. 1 is shown below.

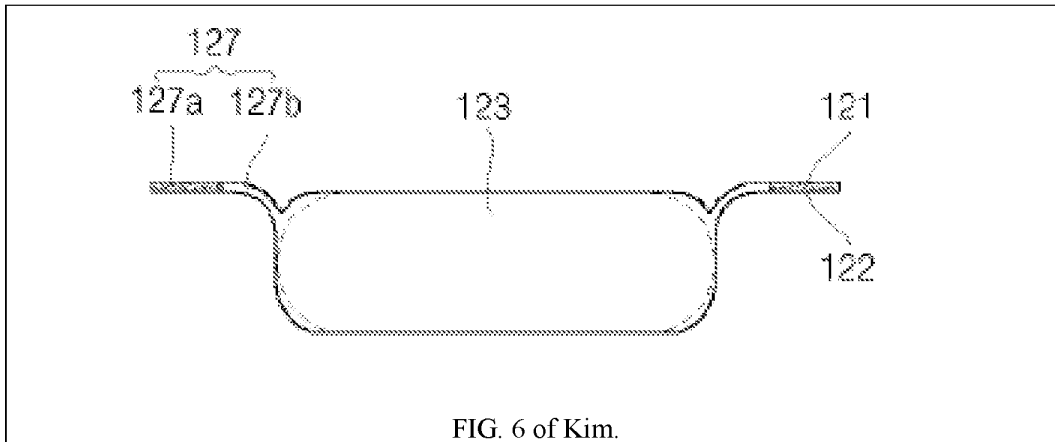


A. The cited reference does not teach “a second part protruding from the first part [covering a second plane of the electrode body] in a width direction of the electrode body”

The Office Action correlates the “first part” to Kim’s pouch 120/front surface 121/rear surface 122/groove 123 and correlates the “second part” to Kim’s wing portions 127. See Office Action at pages 2-3.

As amended herein, claim 1 recites the package comprises “a first part covering a second plane of the electrode body” and “a second part protruding from the first part [covering a second plane of the electrode body] in a width direction of the electrode body.” FIG. 6 of Kim, reproduced below, shows that the wing portions 127 extend out of the groove 123. Because the groove 123 in Kim does not cover a second plane of the electrode body,

Kim does not teach “a second part protruding from the first part [covering a second plane of the electrode body] ... ” as recited by the amended claim.



B. The cited reference does not teach “the second part is adhered to the curved side face of the electrode body via an adhesive layer”

Kim does not teach “the second part is adhered to the curved side face of the electrode body via an adhesive layer” as recited in amended claim 1.

Thus, for at least the above reasons, claims 1-7 and 26-28 are patentable over Kim.

Applicant respectfully requests that these rejections be withdrawn.

REMARKS CONCERNING REJECTIONS UNDER 35 U.S.C. 103

II. REJECTION OF CLAIMS 8-25 UNDER 35 U.S.C. 103 AS BEING UNPATENTABLE OVER KIM, AS APPLIED TO CLAIM 5 ABOVE, AND FURTHER IN VIEW OF ARIGA

Claim 20 has been canceled and so its rejection is moot.

Claims 8-19 and 21-25 depend from patentable claim 1 and so it is patentable over Kim. Furthermore, Ariga is not cited for, and does not teach, the limitations that are missing from Kim. Thus, there is no prima facie case of obviousness for claims 8-20 and 21-25 over the cited combination of Kim and Ariga.

Applicant respectfully requests that these rejections be withdrawn.

REMARKS CONCERNING DOUBLE PATENTING REJECTIONS

III. REJECTION OF CLAIMS 1-28 ON THE GROUND OF NONSTATUTORY DOUBLE PATENTING AS BEING UNPATENTABLE OVER CLAIMS 1-17 OF U.S. PATENT NO. 11,094,992 B2

The Applicant respectfully requests that the Examiner reconsider this nonstatutory double patenting rejection when at least one independent claim of this application has been allowed or noted as being allowable over the cited references.

CONCLUDING REMARKS

By responding in the foregoing remarks only to particular positions asserted by the examiner, the Applicant does not necessarily acquiesce in other positions that have not been explicitly addressed. In addition, the Applicant's arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist.

In light of the above amendments and remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney at (650) 843-7558, if a telephone call could help resolve any remaining items.

Respectfully submitted,

Date: November 29, 2022

/Yalei Sun/

57,765

Yalei Sun

(Reg. No.)

MORGAN, LEWIS & BOCKIUS LLP

1400 Page Mill Road

Palo Alto, CA 94304

Phone: (650) 843-7558

E-mail: yalei.sun@morganlewis.com

Electronic Acknowledgement Receipt

EFS ID:	47109366
Application Number:	17374803
International Application Number:	
Confirmation Number:	5191
Title of Invention:	BATTERY
First Named Inventor/Applicant Name:	Bolin Zhou
Customer Number:	24341
Filer:	Yalei Sun
Filer Authorized By:	
Attorney Docket Number:	024607-02-5110-US
Receipt Date:	29-NOV-2022
Filing Date:	13-JUL-2021
Time Stamp:	19:44:13
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		024607-02-5110-US_PAT201607006026US-2_RN FOA.pdf	248115	yes	9
			6bf11851d959ca4da3337d54ffb872e85794f52d		

Multipart Description/PDF files in .zip description			
Document Description		Start	End
Amendment/Request for Reconsideration-After Non-Final Rejection		1	1
Claims		2	5
Applicant Arguments/Remarks Made in an Amendment		6	9
Warnings:			
Information:			
Total Files Size (in bytes):		248115	
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>			

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 17/374,803		Filing Date 07/13/2021		☐ To be Mailed					
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO													
APPLICATION AS FILED - PART I													
		(Column 1)		(Column 2)									
FOR		NUMBER FILED		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(j))		minus 20 = *				x \$100 =							
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *				x \$480 =							
☐ 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													
		(Column 1)		(Column 2)		(Column 3)							
AMENDMENT	11/29/2022		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))		* 27		Minus ** 28		= 0		x \$100 =		0		
	Independent (37 CFR 1.16(h))		* 1		Minus *** 3		= 0		x \$480 =		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	
		(Column 1)		(Column 2)		(Column 3)							
AMENDMENT			CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))		*		Minus **		=		x \$0 =				
	Independent (37 CFR 1.16(h))		*		Minus ***		=		x \$0 =				
	☐ 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.										LIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".										/SUSAN A HAY-DAVIS/			
*** 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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Morgan, Lewis & Bockius LLP (PA)			EXAMINER	
1400 Page Mill Road			SHEIKH, HAROON S	
Palo Alto, CA 94304-1124				
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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):

padocketingdepartment@morganlewis.com
vskliba@morganlewis.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Rejections - 35 USC § 102

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of the appropriate paragraphs of 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)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.

(a)(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

Claim(s) 1-7 and 26-28 is/are rejected under 35 U.S.C. 102(a)(1)/102(a)(2) as being anticipated by Kim (KR100670438B1; foreign copy and machine translation attached).

Regarding **Claim 1**, Kim discloses a battery [pg. 5-6; Figs. 4-6], comprising:

- (A) an electrode body (electrode assembly **130**), and
- (B) a package (pouch **120**), wherein the package comprises a first part (i.e., portion of pouch **120/121/122** comprising the groove **123** for accommodation of the electrode assembly) covering the electrode body, and a second part (wing portions **127**) protruding from the

first part in a first direction (e.g., along horizontal plane of Fig. 5-6), wherein the second part comprises a curved portion.

Regarding **Claim 2**, Kim discloses wherein a projection of the first part in the first direction overlaps with a projection of the second part in the first direction [Fig. 6].

Regarding **Claim 3**, Kim discloses wherein the projection of the second part in the first direction is located within the projection of the first part in the first direction [Fig. 6].

Regarding **Claim 4**, Kim discloses wherein a projection of the first part in a second direction (e.g., along vertical plane of Figs. 5-6) overlaps with a projection of the second part in the second direction, the second direction being perpendicular to the first direction [Fig. 6].

Regarding **Claim 5**, Kim discloses wherein the first part comprises:

- (i) a first surface extending in the first direction (e.g., upper surface of battery body);
- (ii) a second surface extending in the first direction (e.g., lower surface of battery body), wherein the second surface is opposite to the first surface in a second direction, the second direction being perpendicular to the first direction; and
- (iii) a first side surface (e.g., either side surface of battery body extending in the vertical plane and in contact with the wing portions **127**) connecting the first surface and the second surface [Figs. 5-6].

Regarding **Claim 6**, Kim discloses wherein the second part comprises a first region comprising the curved portion, wherein the first region is connected to the first part [Figs. 4-6].

Regarding **Claim 7**, Kim discloses wherein a projection of the first region in the second direction overlaps with a projection of the first part in the second direction [Fig. 6].

Regarding **Claim 26**, Kim discloses wherein at least one of the first surface or the second surface has a flat region in the first direction [Figs. 5-6].

Regarding **Claim 27**, Kim discloses wherein the first side surface faces to the second part in the first direction [Fig. 6].

Regarding **Claim 28**, Kim discloses wherein the first side surface faces to the second part in the first direction [Fig. 6].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103 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(s) 8-25 is/are rejected under 35 U.S.C. 103 as being unpatentable over Kim, as applied to claim 5 above, and further in view of Ariga (US 2014/0212717 A1).

Regarding **Claim 8**, Kim fails to disclose wherein the second part further comprises a second region, and a folded portion connecting the first region and the second region. However, Ariga, from the same field of endeavor, discloses a battery comprising an electrode body (element **3**) and a package (insulating protection film **41**), wherein the package comprises a first part covering the electrode body, and a second part (protruding end portion **42**) protruding in a first direction (i.e., away from the curved

portion **31a** of the electrode body) [Ariga – Figs. 6-9]. Ariga further discloses wherein the second part comprises a first region and a second region, and a folded portion (fold-over **44**) connecting the first region and the second region [Ariga – par. 0050; Fig. 9] *{That is, the protruding end portion 42 may be folded multiple times}*. Therefore, before the effective filing date of the claimed invention, it would have been obvious for an ordinary skilled artisan to have modified the battery of Kim wherein the second part further comprises a second region, and a folded portion connecting the first region and the second region as a well-known method for method for providing a seal at the wing portion.

Regarding **Claim 9**, modified Kim discloses wherein a projection of the folded portion in the second direction is located within a projection of the first region in the second direction (i.e., the first and second regions are folded-over to overlap one another) [Ariga – Fig. 9].

Regarding **Claim 10**, modified Kim discloses wherein projection of the second region in the second direction is located within a projection of the first region in the second direction [Ariga – Fig. 9].

Regarding **Claim 11**, modified Kim discloses wherein a projection of the folded portion in the second direction and a projection of the second region in the second direction are located within projection of the first region in the second direction [Ariga – Fig. 9].

Regarding **Claim 12**, modified Kim discloses wherein a projection of the first region in the first direction is located within a projection of the first part in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 13**, modified Kim discloses wherein a projection of the folded portion in the first direction is located within a projection of the first part in the first direction [Ariga – Fig. 9].

Regarding **Claim 14**, modified Kim discloses wherein a projection of the second region in the first direction is located within a projection of the first part in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 15**, modified Kim discloses wherein a projection of the first region in the first direction and a projection of the folded portion in the first direction are located within a projection of the first part in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 16**, modified Kim discloses wherein a projection of the first region in the first direction and a projection of the second region in the first direction are located within a projection of the first part in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 17**, modified Kim discloses wherein a projection of the folded portion in the first direction and a projection of the second region in the first direction are located within a projection of the first part in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 18**, modified Kim discloses wherein a projection of the first region in the first direction, a projection of the folded portion in the first direction, and a projection of the second region in the first direction are located within a projection of the first part in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 19**, modified Kim discloses wherein the second region comprises a first end portion connected to the folded portion, and a second end portion opposite to the first end portion, and wherein a projection of the second end portion in the first direction is located between a central plane of the first part and a projection of the first surface in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 20**, Kim teaches the battery further comprises an adhesive layer (i.e., heat seal layer that acts as an adhesive layer constituting part of the pouch **120** – not shown) [pg. 6].

Regarding **Claim 21**, modified Kim discloses wherein the adhesive layer is provided between the first side surface and the second region in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 22**, modified Kim discloses wherein the adhesive layer is provided between the first side surface and the first region in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 23**, modified Kim discloses wherein the adhesive layer is provided between the first region and the second region in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 24**, modified Kim discloses wherein the adhesive layer is provided between the first side surface, the first region and the second region in the first direction [Kim – Fig 6; Ariga – Fig. 9].

Regarding **Claim 25**, modified Kim fails to disclose wherein a unit mass of the adhesive layer is 0.1 to 0.25 mg/mm in the second direction. However, the unit mass of the adhesive layer is merely a property of the material constituting the adhesive layer that may be selected based on the material of the battery package for forming a proper seal. Therefore, before the effective filing date of the claimed invention, it would have been obvious for an ordinary skilled artisan to have selected a suitable material to be used for the adhesive layer that is capable of providing a proper seal to the battery package, wherein the adhesive layer to have a unit mass of the adhesive layer is 0.1 to 0.25 mg/mm in the second direction without undue experimentation and with a reasonable expectation of success.

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 conflicting claims 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); *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 nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined 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 § 2146 *et seq.* 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/patent/patents-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 www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 1-28 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 11,094,992 B2. Although the claims at issue are not identical, they are not patentably distinct from each other because they pertain to the same invention using different terminology, and all of the limitations of the instant claims can be found in the Patent claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Note that the following prior art anticipates at least the subject matter of claim 1.

➤ **US2009/0023058A1 [see Fig. 5B]; US2014/0356672A1 [see Fig. 5B]; US5,088,870A [Figs. 1-2]**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HAROON S SHEIKH whose telephone number is (571)270-0302. The examiner can normally be reached 9-5.

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, MIRIAM STAGG can be reached on (571) 270-5256. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HAROON S. SHEIKH
Examiner
Art Unit 1724

/Haroon S. Sheikh/
Primary Examiner, Art Unit 1724

<i>Notice of References Cited</i>	Application/Control No. 17/374,803		Applicant(s)/Patent Under Reexamination Zhou, Bolin	
	Examiner HAROON S SHEIKH		Art Unit 1724	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20090023058-A1	01-2009	Kim; Joongheon	H01M50/10	429/131
*	B	US-20140356672-A1	12-2014	LEE; Won-Il	H01M10/425	429/186
*	C	US-5088870-A	02-1992	Fukuhara; Akio	F25D5/02	413/4
	D					
	E					
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	I					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N	KR100670438B1	01-2007	KR	Kim	H01M50/10
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	KR100670438B1 - machine translation (Year: 2007)
	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.

<i>Search Notes</i> 	Application/Control No. 17/374,803	Applicant(s)/Patent Under Reexamination Zhou, Bolin
	Examiner HAROON S SHEIKH	Art Unit 1724

CPC - Searched*		
Symbol	Date	Examiner
h01m50	08/27/2022	hs
h01m10	08/27/2022	hs

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

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

Search Notes		
Search Notes	Date	Examiner
h01m50	08/27/2022	hs
h01m10	08/27/2022	hs
Inventor/Assignee search	08/27/2022	hs
Forward/Backward Citation search	08/27/2022	hs

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/Haroon S. Sheikh/ Primary Examiner, Art Unit 1724	
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(73) 특허권자	삼성에스디아이 주식회사 경기 수원시 영통구 신동 575
(72) 발명자	김중현 경기 용인시 기흥읍 공세리 428-5 이형복 경기 용인시 기흥읍 공세리 428-5
(74) 대리인	서만규 서경민

심사관 : 박귀환

전체 청구항 수 : 총 6 항

(54) 파우치형 리튬 이차 전지

(57) 요약

본 발명은 파우치의 양측부에 전극조립체 수용부의 끝단으로부터 이격된 실링부를 형성함으로써 측면에 곡률을 형성할 수 있는 파우치형 리튬 이차 전지에 관한 것이다.

본 발명에 따른 파우치형 리튬 이차 전지는 제 1 전극 탭이 부착된 제 1 전극판, 제 2 전극 탭이 부착된 제 2 전극판 및 상기 제 1 전극판 및 제 2 전극판 사이에 위치하는 선페레이터를 구비하는 전극 조립체; 및 전면과, 전극 조립체 수용부를 가지는 후면으로 이루어진 파우치를 구비하여 이루어지며, 상기 전극 탭이 인출되지 않는 파우치의 양측부에서 연장되는 날개부 각각은 상기 파우치의 전면과 후면의 융착에 의해 접합되는 실링부와, 상기 실링부와 상기 전극 조립체 수용부 끝단 사이에 형성된 미실링부를 포함함을 특징으로 한다.

도 1

도 4

특허청구의 범위

청구항 1.

제 1 전극 탭이 부착된 제 1 전극판, 제 2 전극 탭이 부착된 제 2 전극판 및 상기 제 1 전극판 및 제 2 전극판 사이에 위치하는 세퍼레이터를 구비하는 전극 조립체; 및

전면과, 전극 조립체 수용부를 가지는 후면으로 이루어진 파우치를 구비하여 이루어진 파우치형 리튬 이차 전지에 있어서,

상기 전극 탭이 인출되지 않는, 상기 전극 조립체 수용부의 마주보는 양측부에서 연장된 상기 파우치의 날개부 각각은 상기 파우치의 전면과 후면의 융착에 의해 접합되는 실링부와, 상기 실링부와 상기 전극 조립체 수용부 끝단 사이에 형성된 미실링부를 포함함을 특징으로 하는 파우치형 리튬 이차 전지.

청구항 2.

제 1항에 있어서,

상기 미실링부 각각은 0.5 내지 1.5mm의 폭으로 이루어짐을 특징으로 하는 파우치형 리튬 이차 전지.

청구항 3.

제 1항에 있어서,

상기 미실링부에는 상기 전극 조립체 수용부의 양측면을 커버하기 위해 접히는 상기 날개부의 절곡라인이 형성됨을 특징으로 하는 파우치형 리튬 이차 전지.

청구항 4.

제 3항에 있어서,

상기 날개부가 상기 전극 조립체 수용부가 형성된 방향으로 접힐 경우, 상기 날개부의 절곡라인은 상기 파우치 후면의 미실링부 가운데 형성됨을 특징으로 하는 파우치형 리튬 이차 전지.

청구항 5.

제 3항에 있어서,

상기 날개부가 상기 전극 조립체 수용부가 형성된 방향과 반대되는 방향으로 접힐 경우, 상기 날개부의 절곡라인은 상기 파우치 전면의 미실링부 가운데 형성됨을 특징으로 하는 파우치형 리튬 이차 전지.

청구항 6.

제 4항 또는 제 5항에 있어서,

상기 날개부가 상기 절곡라인을 통해 접혀져 라운드 형태의 측면이 형성됨을 특징으로 하는 파우치형 리튬 이차 전지.

명세서

발명의 상세한 설명

발명의 목적

발명이 속하는 기술 및 그 분야의 종래기술

본 발명은 파우치형 리튬 이차 전지에 관한 것으로서, 보다 상세하게는 파우치의 측부에 이격된 실링부를 형성함으로써 측면에 곡물을 형성할 수 있는 파우치형 리튬 이차 전지에 관한 것이다.

리튬 이차 전지는 리튬과 수분의 반응성 때문에 비수성 전해질을 사용한다. 이 전해질은 리튬염을 함유하는 고체 폴리머이거나, 리튬염이 유기 용매에서 해리된 액상일 수 있다. 리튬 이차 전지를 전해질 종류에 따라 구분해 보면, 액체 전해질을 사용하는 리튬 금속전지와 리튬 이온전지, 그리고 고분자 전해질을 사용하는 리튬 이온 폴리머 전지로 구분할 수 있다.

완전 고체형 리튬 이온 폴리머 전지의 경우에는 유기 전해액의 누출문제가 없고, 유기 전해액을 함유하는 겔형 리튬 이온 폴리머 전지의 경우에는 유기 전해액의 누출 문제가 발생될 수 있다. 그러나, 액체 전해질을 사용하는 리튬 이온 전지와 비교할 때 리튬 이온 폴리머 전지의 경우 전해액의 누출 문제는 보다 간단한 형태로 방지될 수 있다. 가령, 리튬 이온 폴리머 전지는 금속 포일과 이 포일을 덮는 하나 이상의 폴리머 막으로 구성된 다층막 파우치를 리튬 이온 전지의 금속캔(can) 대신 사용할 수 있다.

다층막 파우치를 사용할 경우에는 금속캔을 사용할 때보다 전지의 무게를 현저히 줄일 수 있다. 다층막 파우치에서 포일을 이루는 금속으로 통상 알루미늄이 이용된다. 파우치막 내층을 이루는 폴리머막은 전해질로부터 금속 포일을 보호함과 아울러, 양극과 음극, 그리고 전극 탭들 사이의 단락(short)을 방지한다.

도 1은 종래의 파우치형 리튬 이차 전지의 일예에서 파우치가 밀봉되기 전의 상태를 나타내는 사시도이고, 도 2는 종래의 파우치형 리튬 이차 전지의 배어 셀 상태에서 파우치의 홈의 저면이 상부방향으로 향한 상태를 나타내는 평면도이다.

종래의 파우치형 리튬 이차전지는 전극 조립체(30), 전극 조립체를 수용하는 파우치(20)를 구비하여 이루어진다.

도 1을 참조하여 파우치형 리튬 이차 전지의 일반적 형성 방법을 살펴보면, 우선, 직방형 파우치막을 중간을 접철하여 파우치(20)의 전면(21) 및 후면(22)을 이룬다. 후면(22)에는 프레스(press)가공 등을 통해 전극 조립체(30)가 수용될 수 있는 홈(23)이 형성된다.

통상의 전극 조립체(30)는 양극(31), 세퍼레이터(33), 음극(35)의 순서로 적층된 다층막을 와형으로 권취하여 젤리 롤(Jelly Roll)로 형성한다. 젤리 롤을 권취 형성할 때 양극과 음극의 단락을 막기 위해 롤(roll)의 외부로 드러나는 전극면 혹은 내부 전극면에는 세퍼레이터가 덧붙여진다. 형성된 젤리 롤은 파우치 후면(22)의 홈(23)에 놓여지고 가장자리부(25)를 밀착시킨 상태에서 가열 가압하여 파우치 밀봉을 실시하여 배어 셀 전지를 형성한다.

전극 조립체(30)의 양극(31)과 음극(35)을 파우치 외부와 전기적으로 연결하기 위해 양극(31) 및 음극(35)의 일 측에는 전극 탭(37, 38) 혹은 전극 리드가 형성된다. 이들 전극 탭(37, 38)은 젤리 롤이 권취되는 방향과 수직방향으로 젤리 롤에서 돌출되도록 형성하고, 파우치의 밀봉되는 한 변을 통과하여 인출된다.

파우치 밀봉 과정에서 파우치 내면의 폴리머막과 전극 탭(37, 38)을 이루는 금속 사이의 접촉을 강화하기 위해 폴리머막 표면에 특정 성분을 함유시키거나, 밀봉 전 전극 탭(37, 38)이 파우치(20) 사이의 단락을 방지하기 위한 절연 테이프(39)를 더 구비할 수도 있다.

파우치 밀봉이 이루어져 형성된 배어 셀(bare cell)에 도시되지 않은 보호 회로 모듈(PCM:protecting circuit module)이나 PTC(positive temperature coefficient)같은 부속품 혹은 구조체가 부착되어 코어 팩(core pack)이 형성된다.

그리고, 코어 팩을 하드 케이스에 내장하여 결합시키면 완성된 하드 팩 전지가 형성된다. 하드 케이스는 그 내측에 별도의 회로나 도전체부 없이 폴리 프로필렌 수지 등을 이용하여 형성할 수 있으나, 전지가 사용되는 기기의 특성에 따라 하드 케이스 내부에 별도의 부속회로 기타 도전체부를 가지는 경우가 있다.

도 1 및 도 2를 참조하면, 전면(21)과 홈(23)을 포함하는 후면(22)이 밀착된 파우치(20)의 주변에 플랜지처럼 가장자리부가 형성된다. 특히, 전극 탭(37,38)이 관통하는 변 외의 마주보는 두 변의 가장자리부는 배어 셀에서 코어 팩 상태를 형성하면서 가장자리부를 전극 조립체가 내장되는 홈(23)이 형성된 쪽으로 접는 가공이 이루어진다.

한편, 파우치형 리튬 이차 전지의 전극탭(37,38)이 인출되는 방향을 "상부"방향으로 가정한다.

홈(23)을 포함하는 파우치 후면(22)에 전극 조립체(30)가 수용된 다음에, 홈(23)의 가장자리(25)를 따라 열융착이 실시되고, 특히, 전극 탭(37,38)이 관통하는 변 외의 마주보는 두변의 가장자리부가 열융착으로 인해 홈(23)의 양측부에 실링부(27)를 형성한다. 이렇게 홈(23)의 양측부에 형성된 실링부(27)는 홈(23)이 형성된 방향으로 접혀 파우치 베어셀의 양측면을 커버한다. 여기서, 파우치 베어셀의 양측부 방향에 형성된 실링부(27)는 파우치 후면(22)의 홈(23)에 닿거나, 홈(23)의 끝단으로부터 0.1mm정도 이격되어 형성된다. 이러한 실링부(27)와 홈(23)의 끝단부와의 사이에서는 공간적 여유가 적기 때문에, 실링부 경계가 절곡부를 이루면서 경화된 실링부(27)가 파우치 베어셀의 양측면으로 접힐때 접혀지는 모서리를 각진 형태로 만든다. 특히, 융착과정에서 녹아 홈(23)쪽으로 밀려나온 CPP(Casted Polypropylene)가 굳어 홈(23)과 실링부 경계에 라인 형태로 심을 이루며 남아 절곡시 경계를 만들고 파우치 외형에 절곡부의 각진부분을 부각시키게 된다.

이렇게 측면이 각진 모서리 형태를 갖는 파우치 베어셀을 코어셀로 형성한 후 하드케이스에 조립할 경우, 굽힘 현상이 발생할 수 있다. 또한, 최근에는 휴대용 전자 기기의 구조가 사용자의 요구에 따라 둥근 형태인 추세인데, 측면 모서리가 각진 형태를 가지는 파우치 전지는 둥근 형태의 전지 팩에 적용하기 어려운 문제점이 있다.

발명의 이루고자 하는 기술적 과제

본 발명은 상술한 바와 같은 문제점을 해소시키기 위해 안출된 것으로서, 본 발명의 목적은 파우치의 양측부에 전극조립체 수용부의 끝단으로부터 이격된 실링부를 형성함으로써 측면에 곡률을 형성할 수 있는 파우치형 리튬 이차 전지를 제공하는 것이다.

발명의 구성

상기 목적을 달성하기 위한 본 발명의 실시예에 따른 파우치형 리튬 이차 전지는 제 1 전극 탭이 부착된 제 1 전극판, 제 2 전극 탭이 부착된 제 2 전극판 및 상기 제 1 전극판 및 제 2 전극판 사이에 위치하는 세퍼레이터를 구비하는 전극 조립체; 및 전면과, 전극 조립체 수용부를 가지는 후면으로 이루어진 파우치를 구비하여 이루어지며, 상기 전극 탭이 인출되지 않는, 상기 전극 조립체 수용부의 마주보는 양측부에서 연장된 상기 파우치의 날개부 각각은 상기 파우치의 전면과 후면의 융착에 의해 접합되는 실링부와, 상기 실링부와 상기 전극 조립체 수용부 끝단 사이에 형성된 미실링부를 포함함을 특징으로 한다.

상기 미실링부 각각은 0.5 내지 1.5mm의 폭으로 이루어질 수 있다.

상기 미실링부에는 상기 전극 조립체 수용부의 양측면을 커버하기 위해 접히는 상기 날개부의 절곡라인이 형성될 수 있다.

상기 날개부가 상기 전극 조립체 수용부가 형성된 방향으로 접힐 경우, 상기 날개부의 절곡라인은 상기 파우치 후면의 미실링부 가운데 형성될 수 있다.

상기 날개부가 상기 전극 조립체 수용부가 형성된 방향과 반대되는 방향으로 접힐 경우, 상기 날개부의 절곡라인은 상기 파우치 전면의 미실링부 가운데 형성될 수 있다.

상기 날개부가 상기 절곡라인을 통해 접혀져 라운드 형태의 측면이 형성될 수 있다.

이하 도면을 참조하면서 본 발명의 실시예를 통해 본 발명을 보다 상세히 설명하기로 한다.

도 3은 본 발명의 일 실시예에 따른 파우치형 리튬 이차 전지의 파우치가 밀봉되기 전의 상태를 나타내는 사시도이고, 도 4는 본 발명의 일 실시예에 따른 파우치형 리튬 이차 전지의 베어 셀 상태에서 파우치막의 홈의 저면이 상부방향으로 향한 상태를 나타내는 평면도이다.

도 3을 참조하면, 본 발명의 일 실시예에 따른 파우치형 리튬 이차전지는 전극 조립체(130)와 전극 조립체(130)를 수용하는 파우치(120)를 구비하여 이루어진다.

전극 조립체(130)는 양극 활물질 및 음극 활물질 중 어느 하나, 예를 들면, 양극 활물질이 코팅된 제 1전극판(131), 양극 활물질 및 음극 활물질 중 다른 하나, 예를 들면, 음극 활물질이 코팅된 제 2 전극판(135), 제 1 전극판(131) 및 제 2전극판

(135) 사이에 위치하여 제 1 전극판(131)과 제 2 전극판(135)의 단락(short)을 방지하고 리튬 이온의 이동만 가능하게 하는 세퍼레이터(133)로 이루어진다. 또한, 제 1 전극판(131)에는 일반적으로 알루미늄(Al) 재질로 이루어지며, 일정 길이 돌출되어 양극 탭으로 작용하는 제 1 전극탭(137)이 접합되어 있다. 제 2 전극판(135)에는 일반적으로 니켈(Ni) 재질로 이루어지며, 일정 길이 돌출되어 음극 탭으로 작용하는 제 2 전극 탭(138)이 접합되어 있으나, 본 발명에서 위의 재질을 한정하는 것은 아니다. 또한, 제 1 전극 탭(137) 및 제 2 전극 탭(138)과 파우치(120)의 사이의 단락을 방지하기 위한 절연 테이프(139)를 더 구비할 수도 있다. 또한, 상기 제 1 전극 탭(137) 및 제 2 전극 탭(138)은 파우치(120)의 어느 일측면을 통하여 외부로 인출되며, 이러한, 제 1 전극 탭(137) 및 제 2 전극 탭(138)은 보호 회로 모듈(미도시)과 전기적으로 연결된다. 더불어 전극 조립체(130)의 상·하부에는 전극 조립체(131)가 파우치(120)와 접촉하는 것을 방지하기 위해 상·하부 절연 플레이트(미도시)가 더 부착될 수도 있다.

또한, 양극 활물질로는 칼코게나이드(chalcogenide) 화합물이 사용되고 있으며, 그 예로 LiCoO_2 , LiMn_2O_4 , LiNiO_2 , $\text{LiNi}_{1-x}\text{Co}_x\text{O}_2$ ($0 < x < 1$), LiMnO_2 등의 복합 금속 산화물들이 사용되고 있다. 음극 활물질은 탄소(C)계열 물질, Si, Sn, 티 옥사이드, 티 합금 복합체(composite tin alloys), 전이 금속 산화물, 리튬 금속 나이트라이드 또는 리튬 금속 산화물 등이 사용되고 있다. 또한, 일반적으로 양극 전극판은 알루미늄(Al) 재질, 음극 전극판은 구리(Cu) 재질을 사용하며, 세퍼레이터는 일반적으로 폴리에틸렌(PE) 또는 폴리프로필렌(PP)을 사용하지만, 본 발명에서 위의 재질을 한정하는 것은 아니다.

한편, 본 발명에서는 파우치형 리튬 이차전지의 제 1 전극 탭(137) 및 제 2 전극 탭(138)이 인출되는 방향을 "상부" 방향으로 가정한다.

파우치(120)는 파우치막의 중간이 접착되어 전면(121)과, 전면(121)과 결합되는 후면(122)을 이룬다. 후면(122)에는 프레스(press)가공 등을 통해 전극 조립체(130)가 수용될 수 있는 홈(123)이 형성된다.

파우치(120)는 그 재질이 알루미늄(Al)과 같은 금속재로 이루어진 심부와, 심부의 상부면 상에 형성된 열융착층과, 심부의 하부면 상에 형성된 절연막으로 이루어진다. 열융착층은 폴리머 수지인 변성 폴리프로필렌, 예컨대 CPP(Casted Polypropylene)를 사용하여 접착층으로 작용하며, 절연막은 나일론(nylon)이나 폴리에틸렌테레프탈레이트(PET)와 같은 수지재가 형성되어 있을 수 있으나, 여기서 파우치(120)의 구조 및 재질을 한정하는 것은 아니다.

상기와 같은 구조를 가지는 전극 조립체(130)는 제 1 전극판(131), 세퍼레이터(133), 제 2 전극판(135)이 배치된 상태에서 일방향으로 감겨져 있다. 젤리 롤(Jelly Roll)형으로 감겨진 전극 조립체(130)는 홈(123)이 마련된 파우치(120)의 후면(122)에 장착된다.

이 때, 전극 조립체(130)의 각 극판(131)(135)으로부터 인출된 제 1 전극탭(137)과 제 2 전극탭(138)의 단부는 밀봉되는 파우치(120)의 외부로 노출된다. 노출된 제 1 및 제 2 전극탭(137, 138)은 전지의 안전성을 위하여 설치되는 보호 회로 기판(미도시)과 전기적으로 접속되게 된다.

전극 조립체(130)가 장착된 다음에는, 파우치 후면(122)의 홈(123)의 가장자리(125)를 따라 열융착이 이루어져, 파우치 전면(121)과 후면(122)이 결합되어 밀봉이 이루어져 배어 셀이 형성된다.

파우치 밀봉이 이루어져 형성된 배어 셀(bare cell)에 도시되지 않은 보호 회로 모듈(PCM:protecting circuit module)이나 PTC(positive temperature coefficient)같은 부속품 혹은 구조체가 부착되어 코어 팩(core pack)이 형성된다.

도 4를 참조하면, 전면(121)과 홈(123)을 포함하는 후면(122)이 밀착된 파우치(120)의 주변에 플랜지처럼 가장자리부(125)가 형성된다. 특히, 전극 탭(137, 138)이 관통하는 변 외의 마주보는 두 변의 가장자리 부분은 배어 셀에서 코어 팩 상태를 형성하면서 가장자리부를 접는 가공이 이루어진다.

홈(123)을 포함하는 파우치 후면(122)에 전극 조립체(130)가 수용된 다음에, 홈(123)의 가장자리(125)를 따라 열융착이 실시되고, 특히, 전극 탭(137, 138)이 관통하는 변 외의 마주보는 두 변의 가장자리 부분, 즉, 홈(123)의 양측에 위치하는 파우치의 날개부(127)는 홈(123)의 끝단으로부터 일정간격을 가지고 이격되어 융착된 실링부(127a)와, 실링부(127a)와 홈(123)의 끝단 사이에 미실링부(127b)를 갖는다. 날개부(127)는 미실링부(127b)에 형성되는 절곡라인을 통해 홈(123)이 형성된 방향으로 접혀 파우치 배어셀의 양측면을 커버한다. 이렇게 날개부(127)가 홈(123)이 형성된 방향으로 접힐 경우, 절곡라인은 파우치 후면(122)의 미실링부(127b)에 형성된다. 물론, 날개부(127)는 홈(123)이 형성된 방향에 반대되는

도 3은 본 발명의 원 실시예에 따른 파우치형 리튬 이차 전지의 파우치가 밀봉되기 전의 상태를 나타내는 사시도이다.

도 2는 종래의 파우치형 리튬 이차 전지의 배어 셀 상태에서 파우치막의 홈의 저면이 상부방향으로 향한 상태를 나타내는 평면도이다.

도 1은 종래의 파우치형 리튬 이차 전지의 일예에서 파우치가 밀봉되기 전의 상태를 나타내는 사시도이다.

도면의 간단한 설명

이상 설명한 바와 같이, 본 발명은 상술한 특정의 바람직한 실시예에 한정되지 아니하며, 특허청구범위에서 청구하는 본 발명의 요지를 벗어남이 없이 당해 발명이 속하는 기술분야에서 통상의 지식을 가진 자라면 누구든지 다양한 변형의 실시가 가능한 것은 물론이고, 그와 같은 변경은 특허청구범위 기제의 범위 내에 있게 된다.

이와 같은 파우치형 리튬 이차 전지는 종래의 파우치형 리튬 이차 전지보다 전극 조립체를 수용하기 위한 파우치 후면 홈의 양측면에 형성된 담개부가 큰 공간적 여유를 갖는 절곡부를 통해 자연스럽게 접합되므로써, 파우치의 양측면에 형성되는 절곡조립체 클단으로부터 바깥방향으로 더 큰 간격으로 이격시켜 더 큰 공간적 여유를 갖는 상술한 바와 같이, 본 발명의 실시예에 따른 파우치형 리튬 이차 전지는 종래의 파우치형 리튬 이차 전지에 비해 파우치의

실시예

는 더욱더 자연스럽게 접하면서 국물이 형성된다.

가 다개성(degassing) 공정에서 변형되어 형성된 것으로, 이러한 절곡부를 통해 파우치 배어셀의 양측면에 위치된 담개부 게 접하면서 국물을 형성한다. 더욱이, 절곡부가 파우치 배어셀의 양측면에 형성된 절곡부와 홈의 클단부 사이의 미시적 절곡부를 형성한다. 이러한 미시적 절곡부(degassing) 공정을 통해 변형되어 절곡부로 형성되므로써, 파우치의 양측면에 형성되는 절곡조립체 클단으로부터 바깥방향으로 더 큰 간격으로 이격시켜 더 큰 공간적 여유를 갖는 상술한 바와 같이, 본 발명의 파우치 배어셀은 종래의 파우치 배어셀보다 전극 조립체를 수용하기 위한 파우치 후면 홈의 양측면에 형성된 담개부가 큰 공간적 여유를 갖는 절곡부를 갖기 때문에, 파우치 배어셀의 양측부와 홈의 클단부와의 사이에 더 큰 공간적 여유를 갖는 미시적 절곡부를 갖는다. 이러한 미시적 절곡부는 파우치의 전면과 후면의 융착과정에서 CPP(casted polypropylene)가 용적으로 밀려나와 경화되더라도 큰 공간적 여유로 인해 경화되지 않는 일정부분이 남을 수 있다. 이러

한 절곡부를 통해 파우치 배어셀의 담개부(127)는, 도 6에 도시된 바와 같이, 자연스런 국물을 가지면서 접하게 된다.

(127b)는 담개부(127)가 홈(123)이 형성된 방향으로 접합될 때 절곡부 양측면에 형성된 절곡부와 홈의 클단부(123) 클단 (127b)는 절곡부(127a)보다 유연하기 때문에 쉽게 변형되어 전극 조립체쪽으로 민착될 수 있다. 이렇게 변형된 미시적 절곡부 다. 그리고 최후 용착을 통해 내부를 밀봉하고 담개부에서 연장된 부분을 제거한다. 이 과정에서, 담개부(127)의 미시적 절곡부가 담개부에 연장 형성된 여유공간에 차게 된다. 이후, 파우치 배어셀에 채워진 가스를 제거하는 진공압착이 실시된 여 절곡하고 전극 조립체에 전해액이 함침되면, 파우치 배어셀에 초기 중방전을 실시한다. 그럼, 중방전에 의해 발생된 파우치 배어셀의 전극 조립체에는 담개부(127)의 절곡되지 않은 개방구간을 통해 전해액이 주입된다. 개방구간을 용착하

파우치 후면의 홈(123)의 클단으로부터 0.5 내지 1.5mm 이격되어 형성되고, 이격된 폭을 갖는 부분이 미시적 절곡부(127b)가 방향으로 접할 수도 있다. 이 경우, 절곡라인은 파우치 전면(121)의 미시적 절곡부(127b)에 형성된다. 여기서, 절곡부(127a)는 파우치 후면의 홈(123)의 양측면에 형성된 절곡부(127a)와 미시적 절곡부(127b)를 갖는 파우치 배어셀에 전해액 주입 공정, 초기 중방전 공정, 다개성(degassing) 공정이 실시된다. 이렇게 다개성 공정까지 실시된 파우치 배어셀의 미시적 절곡부(127b)는 형

도 4는 본 발명의 일 실시예에 따른 파우치형 리튬 이차 전지의 베어 셀 상태에서 파우치막의 흡의 저면이 상부방향으로 향한 상태를 나타내는 평면도이다.

도 5는 도 4의 파우치 베에 셀에 디개성 공정이 실시되어 변형된 미실령부를 전극탭이 인출된 방향의 반대방향에서 본 도면이다.

도 6은 도 5의 과우치 베어셀의 양측부에 위치하는 실링부가 홈이 형성된 방향으로 접힌것을 보여주는 도면이다.

〈도면의 주요 부호에 대한 간단한 설명〉

20, 121: 파우치 21, 121: 파우치의 전면

22, 122: 파우치의 후면 23, 123: 흙

25, 125: 가장장리부 127: 날개부

127a: 실링부 127b: 미실링부

130 : 전극 조립체 131: 제 1 전극판

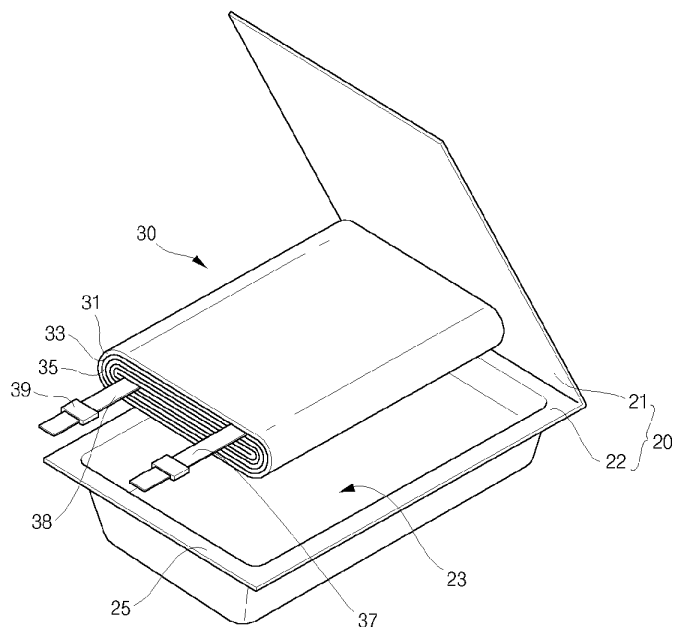
133: 세퍼레이터 135: 제 2 전극판

137: 양극탭 138: 음극탭

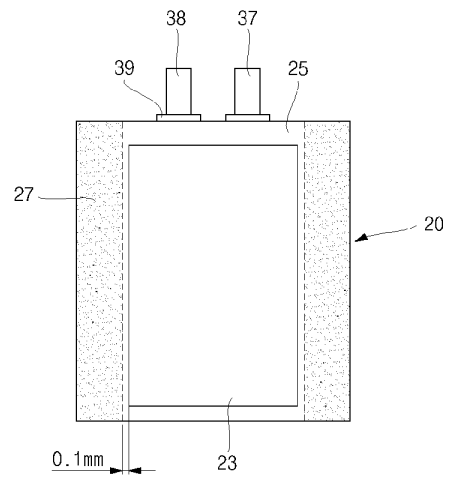
139: 절연 테이프

59

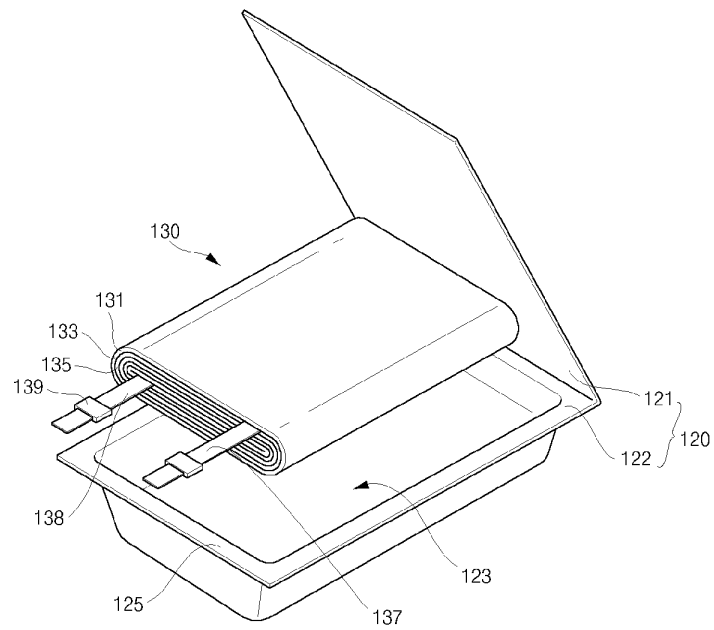
5491

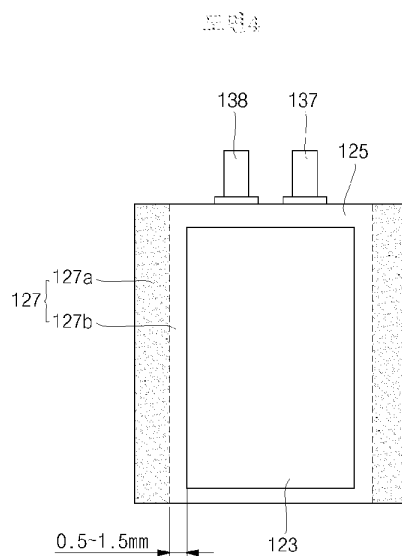
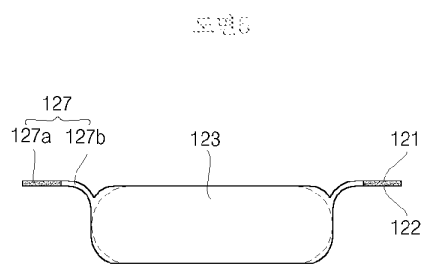
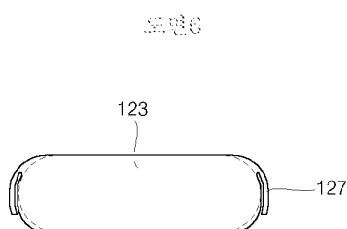


도면2



도면3





PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	86875	((("ZHOU") near3 ("Bolin"))).INV. (((("NINGDE") near3 ("AMPEREX") near3 ("TECHNOLOGY") near3 ("LIMITED")))).AS,AAN M.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:13 PM
L2	1070716	h01m50\$.cpc. h01m10\$.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:14 PM
L3	4066	1 AND 2	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:14 PM
L4	4064	3 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT,	OR	ON	ON	2022/08/27 08:14 PM

			JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L5	341	4 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:14 PM
L6	52800	2 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:16 PM
L7	13061	2 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell)))) near4 (end distal side) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:16 PM
L8	820	2 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2022/08/27 08:16 PM

		(cell device store storing produc\$3 generat\$3 battery cell))) near4 (end distal side) WITH (flange rib) near3 (member portion part segment piece structure) WITH (protrusion protrud\$3 project\$3)	CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L9	258279	2 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell))) near4 (end distal side edge corner)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:17 PM
L10	41364	9 AND (end distal side edge corner) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:17 PM
L11	30379	2 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell))) WITH (end distal side edge corner) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:17 PM
L12	25456	10 AND (battery cell	(US-PGPUB; USPAT;	OR	ON	ON	2022/08/27

		accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell))) WITH (end distal side edge corner) WITH (flange rib protrusion protrud\$3 project\$3) near3 (member portion part segment piece structure)	USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				08:18 PM
L13	13060	9 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3) ADJ (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:18 PM
L14	5934	10 AND (battery cell accumulator ((energy electro\$1chemical electric\$3 power) near2 (cell device store storing produc\$3 generat\$3 battery cell))) WITH (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3) ADJ (member portion part segment piece structure)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:18 PM
L15	407	14 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3) ADJ (member portion part segment piece structure) WITH (curved curvature radius circle circular semi\$1circle semi\$1circular)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO);	OR	ON	ON	2022/08/27 08:18 PM

L16	110	15 AND (end distal side edge corner) near4 (flange rib protrusion protrud\$3 project\$3) ADJ (member portion part segment piece structure) WITH (seal\$3)	FPRS; EPO; JPO; DERWENT; IBM_TDB) (US-PGPUB, USPAT, USOCR, FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/27 08:18 PM
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PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Bibliographic Data

Application No: 17/374,803

Foreign Priority claimed: ☒ Yes ☐ No

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

Verified and Acknowledged:

/Haroon S. Sheikh/

Examiner's Signature

Initials

Title:

BATTERY

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
07/13/2021	429	1724	024607-02-5110-US
RULE			

APPLICANTS

NINGDE AMPEREX TECHNOLOGY LIMITED, Ningde, CHINA

INVENTORS

Bolin Zhou, Ningde, CHINA

CONTINUING DATA

This application is a CON of 16166142 10/21/2018 PAT 11094992

FOREIGN APPLICATIONS

CHINA CN201721567327.2 11/17/2017

IF REQUIRED, FOREIGN LICENSE GRANTED**

07/26/2021

STATE OR COUNTRY

CHINA

ADDRESS

Morgan, Lewis & Bockius LLP (PA)

1400 Page Mill Road

Palo Alto, CA 94304-1124

UNITED STATES

FILING FEE RECEIVED

\$2,620

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				<i>Electronically filed August 29, 2022</i>		
				Application Number	<i>17/374,803</i>	
				Filing Date	<i>July 13, 2021</i>	
				First Named Inventor	<i>Bolin ZHOU</i>	
				Art Unit	<i>1724</i>	
Examiner Name	<i>Haroon S Sheikh</i>					
Sheet	1	of	1	Attorney Docket Number	<i>024607-02-5110-US</i>	

U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	Document Number Number - Kind Code	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	
		20170005300 A1	01-05-2017	Kodama		
FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document Country Code – Number - Kind Code (<i>if known</i>)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T
NON PATENT LITERATURE DOCUMENTS						
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, page(s), volume-issue number(s), publisher, city and/or country where published				
		Zhou, Office Action, US16/166,142, 09DEC2020, 9 pgs.				
		Zhou, Notice of Allowance, US16/166,142, 14AR2021, 8 pgs.				

Examiner Signature		Date Considered	
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DB2/ 43952120.1

Electronic Acknowledgement Receipt

EFS ID:	46511345
Application Number:	17374803
International Application Number:	
Confirmation Number:	5191
Title of Invention:	BATTERY
First Named Inventor/Applicant Name:	Bolin Zhou
Customer Number:	24341
Filer:	Tae-Woong Koo/Edith Fuentes
Filer Authorized By:	Tae-Woong Koo
Attorney Docket Number:	024607-02-5110-US
Receipt Date:	29-AUG-2022
Filing Date:	13-JUL-2021
Time Stamp:	22:48:28
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		024607-02-5110-US_IDS.pdf	375177	yes	5
			68c5123ec44dc0dbdc927ab91370043d13a2bb04		

Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Transmittal Letter			1	4	
Information Disclosure Statement (IDS) Form (SB08)			5	5	
Warnings:					
Information:					
2	Non Patent Literature	Zhou_Office-Action-US16166142_09DEC2020.pdf	309592	no	9
			5124b9cdae2048535458d08f0dcd265bca64cb2		
Warnings:					
Information:					
3	Non Patent Literature	Zhou_Notice-of-Allowance-US16166142_14APR2021.pdf	425274	no	8
			ba7c5487cab07abf64b6133f6b8c47a69ae00757		
Warnings:					
Information:					
Total Files Size (in bytes):			1110043		
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Bolin ZHOU	Confirmation No.:	5191
Serial No.:	17/374,803	Art Unit:	1724
Filed:	July 13, 2021	Examiner:	Haroon S Sheikh
For:	BATTERY	Attorney Docket No.:	024607-02-5110-US

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the duty of disclosure provisions of 37 C.F.R. §1.56, there is hereby provided certain information which the Examiner may consider material to the examination of the subject U.S. patent application. It is requested that the Examiner make this information of record if it is deemed material to the examination of the application.

1. Enclosures accompanying this Information Disclosure Statement are:
 - 1a. ☒ A list of all patents, publications, applications, or other information submitted for consideration by the office.
 - 1b. A legible copy of:
 - ☐ Each foreign patent;
 - ☐ Each publication or that portion which caused it to be listed on the PTO-1449;
 - ☐ For each cited pending U.S. application, the application specification including the claims, and any drawing of the application, or portion of the application which caused it to be listed on the PTO-1449 including any claims directed to that portion;
 - ☒ all other information or portion which caused it to be listed on the PTO-1449.
 - 1c. ☐ An English language copy of search report(s) from a counterpart foreign application or PCT International Search Report.
 - 1d. ☐ Explanations of relevancy (ATTACHMENT 1(d), hereto) or English language abstracts of the non-English language publications.
2. ☒ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(b):
 - ☐ Within three months of the filing date of a national application other than a continued prosecution application under §1.53(d);

- ☐ Within three months of the date of entry of the national stage as set forth in §1.491 in an international application;
- ☒ Before the mailing of the first Office action on the merits;
- ☐ Before the mailing of a first Office action after the filing of a request for continued examination under §1.114.
3. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(c) after the period specified in 37 C.F.R. §1.97(b), but before the mailing date of any of a final action under 37 C.F.R. §1.113, a notice of allowance under 37 C.F.R. §1.311 or an action that otherwise closes prosecution in the application.

(Check either Item 3a, 3b, 3c or 3d)

- 3a. ☐ The Certification Statement in Item 5 below is applicable. Accordingly, no fee is required.
- 3b. ☐ The \$260 (large entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).
- 3c. ☐ The \$130 (small entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).
- 3d. ☐ The \$65 (micro entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

(Items 3b or 3c to be checked if any reference known for more than 3 months)

4. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(d) after the period specified in 37 C.F.R. §1.97(c), but on or before the date of payment of the issue fee.

(Check Item 4a, and 4b, 4c or 4d)

- 4a. ☐ The Certification Statement in Item 5 below is applicable.
- 4b. ☐ The \$260 (large entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).
- 4c. ☐ The \$130 (small entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).
- 4d. ☐ The \$65 (micro entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

5. ☐ Certification Statement (applicable if Item 3a or Item 4a is checked)

(Check either Item 5a, 5b, 5c or 5d)

- 5a. ☐ In accordance with 37 C.F.R. §1.97(e)(1), it is certified that each item of information contained in this information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Information Disclosure Statement.
- 5b. ☐ In accordance with 37 C.F.R. §1.97(e)(2), it is certified 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 C.F.R. §1.56(c) more than three months prior to the filing of this information disclosure statement.
- 5c. ☐ Each item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart application, and the communication was not **received** by any individual designated in 37 C.F.R. §1.56(c) more than thirty days prior to the filing of this information disclosure statement.
- 5d. ☐ Pursuant to 37 C.F.R. §1.704(d), each item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart application, and the communication was not **received** by any individual designated in 37 C.F.R. §1.56(c) more than thirty days prior to the filing of this information disclosure statement.
6. ☒ Copies of each cited U.S. patent and each U.S. patent application publication are not enclosed pursuant to the USPTO OG Notice dated 05 August 2003 waiving the requirement under 37 C.F.R. 1.98(a)(2)(i) for U.S. patent applications filed after June 30, 2003.
7. ☐ This application is a continuation application under 37 C.F.R. §1.53(b) or (d).
(Check appropriate Items 7a, 7b and/or 7c)
- 7a. ☐ A Petition to Withdraw from issue under 37 C.F.R. §1.313(b)(5) is concurrently filed herewith.
- 7b. ☐ Copies of publications listed on Form PTO-1449 from prior application Serial No. _____, filed on _____, of which this application claims priority under 35 U.S.C. §120, are not being submitted pursuant to 37 C.F.R. §1.98(d).
- 7c. ☐ Copies of the publications listed on the attached Form PTO-1449 that were not previously cited in prior application Serial No. _____, filed on _____, are provided herewith.
8. ☐ This is a Supplemental Information Disclosure Statement. (Check Item 8a)
- 8a. ☐ This Supplemental Information Disclosure Statement under 37 C.F.R. §1.97(f) supplements the Information Disclosure Statement filed on _____. A bona fide attempt was made to comply with 37 C.F.R. §1.98, but inadvertent omissions were made. These omissions have been corrected herein. Accordingly, additional time is requested so that this Supplemental Information Disclosure Statement can be considered as if properly filed on _____.

9. ☐ In accordance with 37 C.F.R. §1.98, a concise explanation of what is presently understood to be the relevance of each non-English language publication is:
- (Check Item 9a, 9b, or 9c)*
- 9a. ☐ satisfied because all non-English language publications were cited on the enclosed English language copy of the PCT International Search Report or the search report from a counterpart foreign application indicating the degree of relevance found by the foreign office.
- 9b. ☐ set forth in the application.
- 9c. ☐ enclosed as an attachment hereto.
10. ☒ The Commissioner is authorized to charge any additional fee required or credit any overpayment for this Information Disclosure Statement and/or Petition to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 024607-02-5110-US).
11. ☒ No admission is made that the information cited in this Statement is, or is considered to be, material to patentability nor a representation that a search has been made (other than a search report of a foreign counterpart application or PCT International Search Report if submitted herewith). 37 C.F.R. §§1.97(g) and (h).

Respectfully submitted,

Date: August 29, 2022

/Yalei Sun/

57,765

Yalei Sun

(Reg. No.)

MORGAN, LEWIS & BOCKIUS LLP

1400 Page Mill Road

Palo Alto, CA 94304

(650) 843-4000



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/374,803	07/13/2021	Bolin Zhou	024607-02-5110-US

CONFIRMATION NO. 5191

24341

Morgan, Lewis & Bockius LLP (PA)
1400 Page Mill Road
Palo Alto, CA 94304-1124

PUBLICATION NOTICE



OC000000129593664

Title:BATTERY

Publication No.US-2021-0344073-A1

Publication Date:11/04/2021

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <https://portal.uspto.gov/pair/PublicPair>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/374,803	07/13/2021		2620	024607-02-5110-US	28	1

CONFIRMATION NO. 5191

24341

Morgan, Lewis & Bockius LLP (PA)
1400 Page Mill Road
Palo Alto, CA 94304-1124

FILING RECEIPT



0000000127230712

Date Mailed: 07/28/2021

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Bolin Zhou, Ningde, CHINA;

Applicant(s)

NINGDE AMPEREX TECHNOLOGY LIMITED, Ningde, CHINA;

Power of Attorney: The patent practitioners associated with Customer Number 24341

Domestic Priority data as claimed by applicant

This application is a CON of 16/166,142 10/21/2018

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)
CHINA 201721567327.2 11/17/2017 Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 07/26/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/374,803**

Projected Publication Date: 11/04/2021

Non-Publication Request: No

Early Publication Request: No
Title

BATTERY

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 17/374,803	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A			N/A	320
SEARCH FEE <small>(37 CFR 1.16(k), (i), or (m))</small>	N/A	N/A	N/A			N/A	700
EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	28	minus 20 = *				x 100 =	800
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	1	minus 3 = *				x 480 =	0.00
APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	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).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		TOTAL	2620
APPLICATION AS AMENDED - PART II							
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)	RATE(\$)	ADDITIONAL FEE(\$)
	Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	x =	x =	=
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	x =	x =	=
	Application Size Fee <small>(37 CFR 1.16(s))</small>						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						
				TOTAL ADD'L FEE		TOTAL ADD'L FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)	RATE(\$)	ADDITIONAL FEE(\$)
	Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	x =	x =	=
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	x =	x =	=
	Application Size Fee <small>(37 CFR 1.16(s))</small>						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						
				TOTAL ADD'L FEE		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 found in the appropriate box in column 1.							

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证 明

本证明之附件是向本局提交的下列专利申请文件副本。

申 请 号：201721567327.2

申 请 类 型：实用新型专利

发明 创造 名称：电池

申 请 日：2017 年 11 月 17 日

申 请 人：宁德新能源科技有限公司

发明人或设计人：周伯林

局长

申长雨

2018 年 09 月 05 日



权 利 要 求 书

- 1、一种电池，其特征在于，包括电池主体和折边部，
所述电池主体包括侧面，所述侧面从所述电池主体表面凸起；
所述折边部设置于所述电池主体的外部，所述折边部包括连接于所述电池主体的凸起段，所述凸起段向远离所述电池主体的方向凸起。
- 2、根据权利要求 1 所述的电池，其特征在于，所述折边部还包括收尾段，所述收尾段连接于所述凸起段的末端，所述收尾段位于所述凸起段与所述侧面之间。
- 3、根据权利要求 2 所述的电池，其特征在于，沿所述电池主体的厚度方向，所述电池主体包括第一平面和第二平面，
所述凸起段自所述第二平面的端部向所述第一平面所在的一侧弯曲；
所述收尾段与所述凸起段的连接处为所述收尾段的起始端，所述收尾段的起始端距离所述第一平面的距离为 0.2~0.5mm。
- 4、根据权利要求 3 所述的电池，其特征在于，在所述电池主体的厚度方向，所述收尾段的末端距离所述电池主体的中心面的距离大于 0.2mm，且所述收尾段的末端位于所述第一平面与所述中心面之间。
- 5、根据权利要求 2 所述的电池，其特征在于，还包括粘接层，所述凸起段、所述收尾段以及所述侧面三者中至少相邻的两者之间具有粘接层。
- 6、根据权利要求 5 所述的电池，其特征在于，在所述电池的厚度方向，所述粘接层的单位质量范围为 0.1~0.25mg/mm。
- 7、根据权利要求 1-6 任一项所述的电池，其特征在于，所述侧面的谷底部位与所述凸起段的谷底部位相对。
- 8、根据权利要求 2-6 任一项所述的电池，其特征在于，沿所述电池主体的厚度方向，所述收尾段的起始端位于所述第一平面与所述第二平面之间。
- 9、根据权利要求 1-6 任一项所述的电池，其特征在于，所述凸起段为弧形结构。
- 10、根据权利要求 9 所述的电池，其特征在于，所述弧形结构包括椭

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圓弧形或圓弧形。



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说明书

电池

技术领域

本申请涉及储能器件生产技术领域，尤其涉及一种电池。

背景技术

现有技术中的电池，如锂离子电池中的软包电池，通常将电池侧封边贴靠在电池侧面，贴靠后的侧封边是沿电池厚度方向的竖直结构，这种结构密封可靠性差，且提高了电池侧边的空间占用。

实用新型内容

本申请提供了一种电池，能够解决上述问题。

本申请提供了一种电池，其特征在于，包括电池主体和折边部，

所述电池主体包括侧面，所述侧面从所述电池主体表面凸起；

所述折边部设置于所述电池主体的外部，所述折边部包括连接于所述电池主体的凸起段，所述凸起段向远离所述电池主体的方向凸起。

优选地，所述折边部还包括收尾段，所述收尾段连接于所述凸起段的末端，所述收尾段位于所述凸起段与所述侧面之间。

优选地，沿所述电池主体的厚度方向，所述电池主体包括第一平面和第二平面，

所述凸起段自所述第二平面的端部向所述第一平面所在的一侧弯曲；所述收尾段与所述凸起段的连接处为所述收尾段的起始端，所述收尾段的起始端距离所述第一平面的距离为 0.2~0.5mm。

优选地，在所述电池主体的厚度方向，所述收尾段的末端距离所述电池主体的中心面的距离大于 0.2mm，且所述收尾段的末端位于所述第一平面与所述中心面之间。

优选地，还包括粘接层，所述凸起段、所述收尾段以及所述侧面三者中至少相邻的两者之间具有粘接层。



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优选地，在所述电池的厚度方向，所述粘接层的单位质量范围为0.1~0.25mg/mm。

优选地，所述侧面的谷底部位与所述凸起段的谷底部位相对。

优选地，沿所述电池主体的厚度方向，所述收尾段的起始端位于所述第一平面与所述第二平面之间。

优选地，所述凸起段为弧形结构。

优选地，所述弧形结构包括椭圆弧形或圆弧形。

本申请提供的技术方案可以达到以下有益效果：

本申请所提供的电池，包括电池主体和凸起段，凸起段向远离电池主体的方向凸出，凸起段与电池主体的侧面的谷底部位之间的间隙不会突然变小，避免在谷底部位的胶液由于受到挤压而减少，以尽可能保证在谷底部位的胶液量，提高该处的粘接力，进而保证谷底部位与凸起段的紧贴度，尽可能减少在运输、使用或者存储后折边部张开的问题。

应当理解的是，以上的一般描述和后文的细节描述仅是示例性的，并不能限制本申请。

附图说明

图1为本申请所提供的电池一种具体实施例的结构示意图；

图2为对比例所提供的电池的结构示意图。

附图标记：

在图1中：

10-电池主体；

101-侧面；

102-第一平面；

103-第二平面；

104-中心面；

20-折边部；

201-凸起段；

202-收尾段；

30-粘接层；



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在图 2 中:

10'-电池主体;

103'-第二平面;

20'-折边部。

此处的附图被并入说明书中并构成本说明书的一部分，示出了符合本申请的实施例，并与说明书一起用于解释本申请的原理。

具体实施方式

下面通过具体的实施例并结合附图对本申请做进一步的详细描述。

本申请实施例提供了一种电池，该电池可以为软包电池，或者从加工工艺上说该电池可以为叠片电池。电池包括电池主体 10 和折边部 20，电池主体 10 内包裹有裸电芯，如图 1 中，电池主体 10 的宽度方向为水平方向，厚度方向 T 为竖直方向，高度方向为垂直于水平方向与竖直方向的方向。

具体地，电池主体 10 包括侧面 101，以及沿电池主体 10 的厚度方向设置的第一平面 102 与第二平面 103，第一平面 102 和第二平面 103 分别连接于侧面 101 的两端，沿电池主体 10 的厚度方向，第一平面 102 与第二平面 103 相对。沿电池主体 10 的高度方向，侧面 101 的投影向电池主体 10 的外侧凸出，即侧面 101 由靠近第一平面 102 的一端到靠近第二平面 103 的一端形成凸起结构，且凸向远离电池的方向。

沿电池主体 10 的宽度方向，折边部 20 与侧面 101 相对，折边部 20 包括连接于电池主体 10 的凸起段 201，凸起段 201 向远离电池主体 10 的方向凸起，可以理解地，沿电池主体 10 的高度方向，凸起段 201 的投影向远离电池主体 10 的投影的方向凸出，即凸起段 201 也为凸起结构，并且凸起段 201 的凸出方向与侧面 101 的凸出方向相同。

上述结构中，电池主体 10 的侧面 101 和凸起段 201 均采用凸起结构，且二者的凸起方向相同，在实施时，在折边部 20 涂覆或者滴入胶液，由于凸起段 201 采用凸起结构，在侧面 101 的谷底处能够避免现有技术中由于折边部垂直设置，造成的折边部 20 与侧面 101 的间隙减小问题，使侧面 101 的谷底部位与折边部 20 之间仍有足够的间隙，以容纳较多的胶液，



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防止在此处胶液由于受到挤压而减少，提高该处的粘接力，从而保证谷底部位与凸起段 201 的紧贴度，以尽可能减少在运输、使用或者存储后折边部 20 张开的问题。

可以理解地，折边部 20 可以仅包括凸起段 201，凸起段 201 的一端与电池主体 10 连接，另一端与电池主体 10 粘接固定。也可以折边部 20 包括凸起段 201 和收尾段 202，收尾段 202 连接于凸起段 201 的末端（凸起段 201 的末端指凸起段 201 远离其与电池主体 10 连接处的一端），且收尾段 202 与侧面 101 连接，即凸起段 201 的末端通过收尾段 202 与电池主体 10 连接。

其中，收尾段 202 与凸起段 201 可以沿电池主体 10 的厚度方向布置，即沿电池主体 10 的厚度方向，收尾段 202 的投影与凸起段 201 的投影不存在重合部分。

不论是折边部 20 只包括凸起段 201，还是收尾段 202 沿电池主体 10 的厚度方向 T 布置，在折边部 20 与电池主体 10 粘贴压紧时，胶液会随着折边部 20 的延伸方向流出，在后续装配或者运输过程中，电池可能会与其它部件发生粘接。为了解决上述问题，收尾段 202 位于凸起段 201 与电池主体 10 之间，即沿电池主体 10 的宽度方向，收尾段 202 的投影与凸起段 201 的投影存在重合部分，也就是说收尾段 202 与凸起段 201 至少部分交叠，且收尾段 202 位于凸起段 201 靠近电池主体 10 的一侧，在折边部 20 与电池主体 10 压紧粘接时，收尾段 202 能够尽可能地阻止凸起段 201 与电池主体 10 之间的胶液流出，进而保证折边部 20 与电池主体 10 之间的粘接力。

可以理解地，凸起段 201 自第二平面 103 的端部向第一平面 102 所在的一侧弯折，收尾段 202 自凸起段 201 的末端向第二平面 103 所在的一侧弯折。为了防止收尾段 202 伸出电池主体 10，收尾段 202 与凸起段 201 的连接处，距离第一平面的距离为 0.2~0.5mm，即该距离可以为 0.2mm、0.3mm、0.45mm、0.5mm。当然，收尾段 202 与凸起段 201 的连接处，距离第一平面的距离也可以小于 0.2mm，如 0.19mm、0.15mm、0.1mm 等；或者该距离也可以大于 0.5mm，如 0.55mm、0.6mm、0.7mm 等等。

通常，侧面 101 的谷底部位位于中心面 104 附近，上述中心面 104（该

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中心面为非实体结构)指电池主体 10 中同时平行于上述宽度方向 and 高度方向的中心平面。如果收尾段 202 的末端(收尾段 202 的末端指收尾段 202 远离其与凸起段 201 的连接处的一端)向第二平面 103 延伸的长度较长,甚至超过中心面 104,则会减小侧面 101 的谷底部位与折边部 20 的间隙,因此,收尾段 202 的末端距离电池主体 10 的中心面 104 的距离大于 0.2mm,如 0.21mm、0.25mm、0.3mm、0.4mm 等,且收尾段 202 位于中心面靠近第一平面 102 的一侧。当然,收尾段 202 的末端距离电池主体 10 的中心面 104 的距离也可以小于等于 0.2mm,如 0.2mm、0.18mm、0.15mm、0.1mm。

可以理解地,收尾段 202 可以仅其与凸起段 201 的连接处距离第一平面 102 的距离为 0.2~0.5mm,或者,收尾段 202 的末端距离中心面 104 的距离大于 0.2mm。优选地,收尾段 202 与凸起段 201 的连接处距离第一平面 102 的距离为 0.2~0.5mm,且收尾段 202 的末端距离中心面 104 的距离大于 0.2mm,同时,收尾段 202 位于中心面 104 靠近第一平面 102 的一侧。

上述各实施例中,为了进一步增加侧面 101 的谷底部位与折边部 20 的间隙,侧面 101 的谷底部位与凸起段 201 的谷底部位相对,可选地,侧面 101 的谷底部位指向凸起段 201 的谷底部位的方向平行于电池主体 10 的宽度方向。需要说明的是,侧面 101 的谷底部位也可以与凸起段 201 的其它部位相对。

凸起段 201 可以为椭圆弧结构、圆弧形结构、V 字型结构等。通常,沿电池主体 10 的高度方向,侧面 101 为弧形结构,尤其是软包电池的侧面,而叠片电池由于其宽度方向存在一定的隔膜错位,且隔膜为可压缩结构,因此,为了不增加叠片电池的厚度,叠片电池的侧面也会制备成弧形结构。相应地,凸起段 201 沿该高度方向的投影也为弧形结构,以使凸起段 201 与侧面 101 仿形设计,进一步增加侧面 101 与凸起段 201 之间的间隙,保证二者之间的胶液量。上述弧形结构可以包括椭圆弧结构或者圆弧形结构,优选为圆弧形结构,如图 1 所示,以便于制造。

在凸起段 201 为圆弧形结构时,圆弧形结构的圆心角为 $0^{\circ} \sim 90^{\circ}$,如 0° 、 15° 、 30° 、 45° 、 70° 、 80° 、 90° 等,尤其在收尾段 202 与凸起段 201 的连接处距离第一平面 102 的距离大于 0.2mm 时,能够在侧面 101 的谷底部位处,通过凸起段 201 的弯曲,使凸起段 201 与侧面 101 之

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间的间隙更大,进一步防止胶液的挤出。当然,圆弧形结构的圆心角也可以大于 90° , 如 95° 、 100° 、 110° 等。

进一步地,为了保证折边部 20 不伸出电池主体 10, 沿电池主体 10 的宽度方向, 电池主体 10 的投影的外轮廓包围折边部 20 的投影的外轮廓, 也就是说, 沿电池主体 10 的宽度方向, 折边部 20 的投影可以位于电池主体 10 的投影的外轮廓内; 也可以折边部 20 的投影的外轮廓与电池主体 10 的投影的外轮廓重合; 或者折边部 20 的投影的外轮廓的一部分与电池主体 10 的投影的外轮廓重合, 其余部分位于电池主体 10 的投影的外轮廓内。如图 1 所示, 沿电池主体 10 的厚度方向, 折边部 20 包括第一端和第二端, 沿电池主体 10 的宽度方向, 第一端的投影与第二平面 103 重合, 第二端的投影位于第一平面 102 的投影与第二平面 103 的投影之间。

通常, 电池还包括粘接层 30, 粘接层 30 可以为热熔胶, 如丙烯酸酯结构胶、聚氨酯热熔胶或者环氧树脂结构胶, 凸起段 201、收尾段 202 以及侧面 101 三者中任意相邻的两者之间均通过粘接层 30 粘接, 即凸起段 201 与收尾段 202 相对的两个部分、凸起段 201 与电池主体 10 相对的两个部分以及收尾段 202 与电池主体 10 相对的两个部分均通过粘接胶 30 粘接固定, 以保证折边部 20 的各个部分以及其与电池主体 10 之间的贴合度, 进而防止运输、使用或者放置过程中折边部 20 的张开。

上述各实施例中, 为了保证折边部 20 与电池主体 10 压紧粘贴时不会有溢胶现象, 且能够保证折边部 20 与电池主体 10 的贴合度, 沿折边部 20 的延伸方向, 粘接层 30 的单位质量范围为 $0.1\sim 0.25\text{mg/mm}$, 即折边部 20 在每毫米的长度内涂覆或者滴入 $0.1\sim 0.25\text{mg}$, 如 0.1mg 、 0.15mg 、 0.2mg 、 0.24mg 、 0.25mg 。当然, 粘接胶 30 的胶量也可以小于 0.1mg/mm , 如 0.09mg/mm 、 0.06mg/mm , 或者粘接胶 30 的胶量大于 0.25mg/mm , 如 0.27mg/mm 、 0.30mg/mm 等。

下面以上述实施例的结构与对比例作对比, 其中, 本实施例采用本申请中如图 1 所示的电池, 折边部 20 同时包括凸起段 201 与收尾段 202, 且粘接胶 30 的胶量控制在 $0.1\sim 0.25\text{mg/mm}$; 对比例中的电池的结构如图 2 所示, 折边部 20' 与电池主体 10' 的第二平面 103' 垂直, 这两种电池同时通过高铁拉力机测量, 其中剥离强度为大于 $12\text{N}/8\text{mm}$, 且测试环境的相对湿



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度为 90%RH。具体地，二者在试验中的参数及结果见表 1。

表 1

电池	存储时间	存储前宽度	存储后宽度	存储前后宽度差
本实施例	30 天	38.223mm	38.225mm	0.002mm
对比例	30 天	38.240mm	38.308mm	0.068mm

通过上述实施例与对比例的对比，可以看出，本申请的电池存储前后的电池的宽度差较对比例小，说明折边部 20 的张开较小，显然，本申请的实施例较对比例能够更好地减小折边部 20 的张开问题。其中，表 1 中的存储前（或者后）宽度指电池沿电池主体 10（10'）的宽度方向的尺寸。

以上所述仅为本申请的优选实施例而已，并不用于限制本申请，对于本领域的技术人员来说，本申请可以有各种更改和变化。凡在本申请的精神和原则之内，所作的任何修改、等同替换、改进等，均应包含在本申请的保护范围之内。

说明书附图

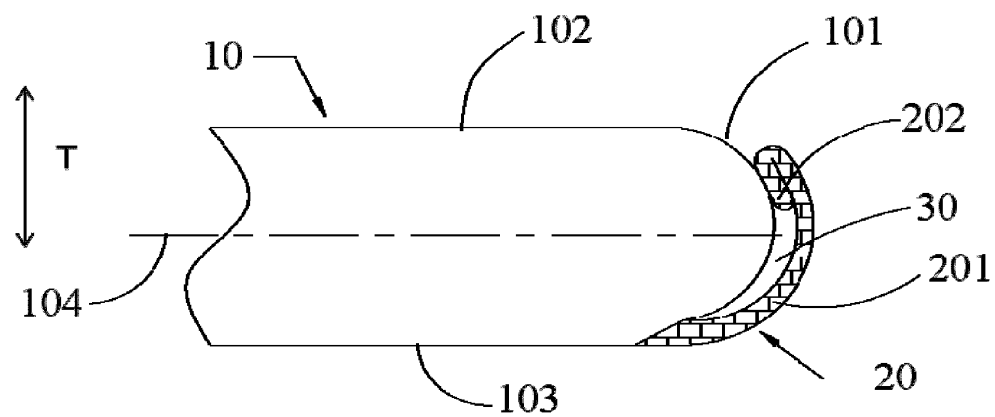


图 1

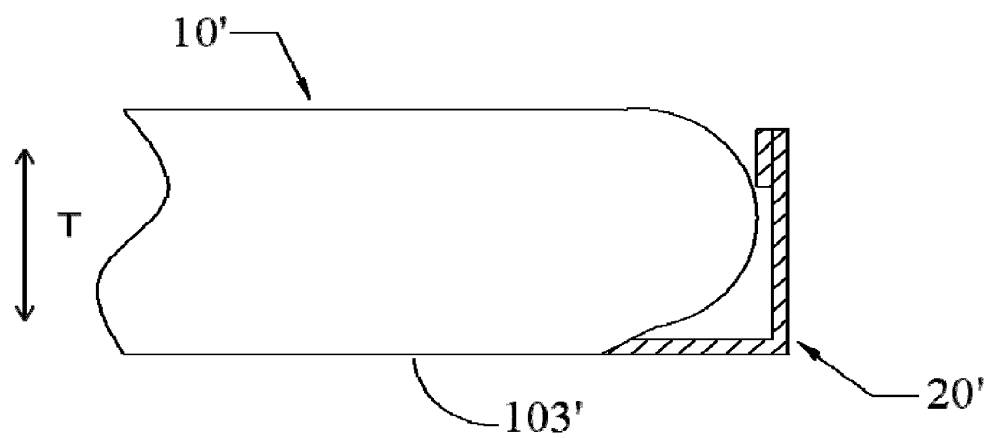


图 2

Doc Code: ECOMM.AUTH/ECOMM.WTDW

Doc Description: Internet Communications Authorized/Internet Communications Authorization Withdrawn

PTO/SB/439 (11-15)

AUTHORIZATION FOR INTERNET COMMUNICATIONS IN A PATENT APPLICATION OR REQUEST TO WITHDRAW AUTHORIZATION FOR INTERNET COMMUNICATIONS	Application No.	To be assigned
	Filing Date	July 13, 2021
	First Named Inventor	Bolin ZHOU
	Art Unit	To be assigned
	Examiner Name	To be assigned
	Practitioner Docket No.	024607-02-5110-US

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I. To authorize permission for Internet Communications.

☒ Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned and practitioners in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via video conferencing, instant messaging, or electronic mail. I understand that a copy of these communications will be made of record in the application file. (MPEP 502.03)

II. To withdraw authorization for Internet Communications.

☐ The authorization given on _____, to the USPTO to communicate with the undersigned and any practitioner in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via Internet communications such as video conferencing, instant messaging, or electronic mail is hereby withdrawn. I understand that the withdrawal is effective when approved rather than when received.

I am the

☐ applicant.

☒ attorney or agent of record. Registration number 57,765.

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

/Yalei Sun/
Signature

July 13, 2021
Date

Yalei Sun
Typed or printed name

650-843-4000
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. Juristic entities must be represented by a patent practitioner (see 37 CFR 1.31, which is applicable to any paper filed on or after September 16, 2012, that is presented on behalf of a juristic entity, regardless of application filing date). Submit multiple forms if more than one signature is required, see below*.

☒ * Total of 1 forms are submitted.

BATTERY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a continuation application of U.S. Patent Application No. 16/166,142, filed on October 21, 2018, which claims the benefit of Chinese Patent Application No. 201721567327.2, filed on November 17, 2017, all of which are incorporated herein by reference in their entirety.

TECHNICAL FIELD

[0002] The present application relates to the field of energy storage device production technologies, in particular, to a battery.

BACKGROUND

[0003] A battery, such as a soft pack battery in a lithium-ion battery, generally has a battery side seal nestling the side of the battery, and the nestled side seal is a vertical structure along the thickness direction of the battery. This structure has poor sealing reliability and increases the space occupying by the side of the battery.

SUMMARY

[0004] The present application provides a battery. The battery includes an electrode body, and a package. The package includes a first part covering the electrode body, and a second part protruding from the first part in a first direction. The second part includes a curved portion.

[0005] The above general description and the following detailed description are merely exemplary and are not intended to be limiting.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Fig. 1 is a structural view of a specific embodiment of a battery provided by the present application; and

[0007] Fig. 2 is a view showing the structure of a battery provided in the comparative example.

[0008] The drawings herein are incorporated in and constitute a part of the specification. Embodiments consistent with the present application are shown and used in conjunction with the specification to explain the principles of the application.

DETAILED DESCRIPTION

[0009] The present application will be further described in detail below through the specific embodiments and the accompanying drawings.

[0010] The embodiment of the present application provides a battery, which may be a soft pack battery, or the battery may be a laminated battery in terms of processing technology. The battery includes a battery body 10 and a flange portion 20, and a bare battery is wrapped in the battery body 10. As shown in Fig. 1, the width direction of the battery body 10 is a horizontal direction, the thickness direction T is a vertical direction, and the height direction is a direction perpendicular to the horizontal direction and the vertical direction.

[0011] Specifically, the battery body 10 includes a side face 101, and a first plane 102 and a second plane 103 arranged in the thickness direction of the battery body 10. The first plane 102 and the second plane 103 are respectively connected at both ends of the side face 101; in the thickness direction of the battery body 10, the first plane 102 is opposed to the second plane 103. In the height direction of the battery body 10, the projection of the side face 101 protrudes toward the outside of the battery body 10, i.e., the side face 101 is formed with a protrusion structure from one end close to the first plane 102 to another one end close to the second plane 103, and protrudes away from the battery.

[0012] In the width direction of the battery body 10, the flange portion 20 is opposite to the side face 101. The flange portion 20 includes a protrusion segment 201 connected to the battery body 10, and the protrusion segment 201 protrudes away from the battery body 10. It may be understood that in the height direction of the battery body 10, the projection of the protrusion segment 201 protrudes away from the

projection of the battery body 10, i.e., the protrusion segment 201 is also a protrusion structure, and the protrusion segment 201 has a protrude direction the same to a protrude direction of the side face 101.

[0013] In above structure, the side face 101 of the battery body 10 and the protrusion segment 201 are both protrusion structures, and the protrusion directions of the two are the same. In embodiments, the glue is coated and dripped to the flange portion 20, and since the protrusion segment 201 has the protrusion structure, it is possible to avoid the problem of the gap reduction between the flange portion 20 and the side face 101 caused by the vertical arrangement of the flange portion in the prior art at the valley bottom of the side face 101, so that there is still enough gap between the valley bottom of the side face 101 and the flange portion 20 to accommodate more glue for preventing glue from decreasing due to the squeeze and increasing the adhesive force there, thereby ensuring the tightness of the valley bottom and the protrusion segment 201 and reducing the problem of opening the flange portion 20 when transporting, using, or storing as much as possible.

[0014] It is to be understood that the flange portion 20 may comprise only the protrusion segment 201; one end of the protrusion segment 201 is connected to the battery body 10, and the other end is bonding fixed to the battery body 10. It is also possible that the flange portion 20 includes the protrusion segment 201 and an ending segment 202, and the ending segment 202 is connected to an end of the protrusion segment 201 (the end of the protrusion segment 201 refers to the end of the protrusion segment 201 away from the connection with the battery body 10); and the ending segment 202 is connected to the side face 101, i.e., the end of the protrusion segment 201 is connected to the battery body 10 through the ending segment 202.

[0015] Among them, the ending segment 202 and the protrusion segment 201 may be arranged in the thickness direction of the battery body 10, i.e., in the thickness direction of the battery body 10, there is no overlapping parts between the projection of the ending segment 202 and the projection of the protrusion segment 201.

[0016] Whether the flange portion 20 includes only the protrusion segment 201 or the ending segment 202 is disposed in the thickness direction T of the battery body 10,

when the flange portion 20 is press-bonded to the battery body 10, the glue flows out along the extending direction of the flange portion 20 and the battery may be bonded to other members during subsequent assembly or transportation. In order to solve above problem, the ending segment 202 is located between the protrusion segment 201 and the battery body 10, i.e., in the width direction of the battery body 10, the projection of the ending segment 202 overlaps with the projection of the protrusion segment 201, that is, the ending segment 202 at least partially overlaps with the protrusion segment 201; and the ending segment 202 is located on the side of the protrusion segment 201 close to the battery body 10, so when the flange portion 20 is press-bonded to the battery body 10, the ending segment 202 may prevent the glue between the protrusion segment 201 and the battery body 10 from flowing out as much as possible, thereby ensuring the adhesive force between the flange portion 20 and the battery body 10.

[0017] It is to be understood that the protrusion segment 201 is bent from the end of the second plane 103 toward the side where the first plane 102 is located, and the ending segment 202 is bent from the end of the protrusion segment 201 to the side where the second plane 103 is located. In order to prevent the ending segment 202 from extending out of the battery body 10, the distance from the connection of the ending segment 202 and the protrusion segment 201 to the first plane is 0.2 to 0.5 mm, that is, the distance may be 0.2 mm, 0.3 mm, 0.45 mm, or 0.5 mm. Of course, the distance from the connection of the ending segment 202 and the protrusion segment 201 to the first plane may be less than 0.2 mm, such as 0.19 mm, 0.15 mm, 0.1 mm, etc.; or the distance may be larger than 0.5 mm, such as 0.55 mm, 0.6 mm, or 0.7 mm, etc..

[0018] Generally, the valley bottom of the side face 101 is located close to the central plane 104, and the central plane 104 (which is a non-solid structure) refers to a center plane of the battery body 10 which is parallel to the width direction and the height direction simultaneously. If the end of the ending segment 202 (the end of the ending segment 202 refers to the end of the ending section 202 away from its connection with the protrusion segment 201) extends to the second plane 103 for a

longer length, even exceeding the central plane 104, the gap between the valley bottom of the side face 101 and the flange portion 20 is reduced. Therefore, the distance from the end of the ending segment 202 to the central plane 104 of the battery body 10 is greater than 0.2 mm, such as 0.21 mm, 0.25 mm, 0.3 mm, 0.4 mm, etc., and the ending segment 202 is located on the side of the central plane close to the first plane 102. Of course, the distance from the end of the ending segment 202 to the central plane 104 of the battery body 10 may be less than or equal to 0.2 mm, such as 0.2 mm, 0.18 mm, 0.15 mm, 0.1 mm.

[0019] It is to be understood that the ending segment 202 may only have a distance of 0.2 to 0.5 mm from the connection of the protrusion segment 201 therewith to the first plane 102, or the distance from the end of the ending segment 202 to the central plane 104 is larger than 0.2 mm. Preferably, the distance from the connection of the ending segment 202 and the protrusion segment 201 to the first plane 102 is 0.2 to 0.5 mm, and the distance from the end of the ending segment 202 to the central plane 104 is larger than 0.2 mm, at the same time, the ending segment 202 is located at the side of the central plane 104 close to the first plane 102.

[0020] In each of above embodiments, in order to further increase the gap between the valley bottom of the side face 101 and the flange portion 20, the valley bottom of the side face 101 is opposed to the valley bottom of the protrusion segment 201. Optionally, the direction of the valley bottom of the side face 101 pointing to the valley bottom of the protrusion segment 201 is parallel to the width direction of the battery body 10. It should be noted that the valley bottom of the side face 101 may be opposed to other parts of the protrusion segment 201.

[0021] The protrusion segment 201 may be an elliptical arc structure, a circular arc structure, a V-shaped structure, or the like. Generally, in the width direction of the battery body 10, the side face 101 is an arc-shaped structure, in particular, the side of the soft pack battery. However, there is a certain separator displacement in the width direction of the laminated battery, and the separator is a compressible structure. Therefore, in order not to increase the thickness of the laminated battery, the sides of the laminated battery are also prepared in an arc shape. Correspondingly, the

projection of the protrusion segment 201 in the height direction is also an arc structure, so that the protrusion segment 201 and the side face 101 are contoured design, further increasing the gap between the side face 101 and the protrusion segment 201 to ensure the amount of the glue therebetween. The above-mentioned arc-shaped structure may comprise an elliptical arc structure or a circular arc structure, preferably a circular arc structure, as shown in Fig. 1, to facilitate the manufacture.

[0022] When the protrusion segment 201 has a circular arc structure, the central angle of the circular arc structure is 0° to 90° , such as 0° , 15° , 30° , 45° , 70° , 80° , 90° , etc.. Especially when the distance from the connection of the ending segment 202 and the protrusion segment 201 to the first plane 102 is larger than 0.2 mm, the gap between the protrusion segment 201 and the side face 101 is made larger at the valley bottom of the side face 101 by the bending of the protrusion segment 201 to further prevent the extrusion of the glue. Of course, the central angle of the circular arc structure may also be larger than 90° , such as 95° , 100° , 110° etc..

[0023] Further, in order to ensure that the flange portion 20 does not extend go beyond the battery body 10, the outer contour of the projection of the battery body 10 surrounds the outer contour of the projection of the flange portion 20 in the width direction of the battery body 10, that is, the projection of the flange portion 20 may be located within the outer contour of the projection of the battery body 10 in the width direction of the battery body 10; it is also possible that the outer contour of the projection of the flange portion 20 coincides with the outer contour of the projection of the battery body 10; or a portion of the outer contour of the projection of the flange portion 20 coincides with the outer contour of the projection of the battery body 10, with the remainder being located within the outer contour of the projection of the battery body 10. As shown in Fig. 1, in the thickness direction of the battery body 10, the flange portion 20 includes a first end and a second end, and in the width direction of the battery body 10, the projection of the first end coincides with the second plane 103, the projection of the second end being located between the projection of the first plane 102 and the projection of the second plane 103.

[0024] Generally, the battery further includes an adhesive layer 30. The adhesive

layer 30 may be a hot melt glue, such as an acrylate structural glue, a polyurethane hot melt glue or an epoxy structural glue. Any adjacent two of the protrusion segment 201, the ending segment 202, and the side face 101 are bonded by the adhesive layer 30, i.e., two opposite portions of the protrusion segment 201 and the ending segment 202, two opposite portions of the protrusion segment 201 and the battery body 10 and two opposite portions of the ending segment 202 and the battery body 10 are all bonding fixed by the adhesive layer 30, so that the fit between each portion of the flange portion 20 and between the flange portion 20 and the battery body 10, are ensured, to further prevent the opening of the flange portion 20 during transportation, use, or placement.

[0025] In each of above embodiments, in order to ensure that the flange portion 20 and the battery body 10 are pressed and adhered without the overflowing of the glue while ensuring the fit between the flange portion 20 to the battery body 10, the unit mass of the adhesive layer 30 is 0.1 to 0.25 mg/mm in the extending direction of the flange portion 20, i.e., the flange portion 20 is coated or dripped with 0.1 to 0.25 mg per mm of length, such as 0.1 mg, 0.15 mg, 0.2 mg, 0.24 mg, 0.25 mg. Of course, the amount of the glue of the adhesive layer 30 may be less than 0.1 mg/mm, such as 0.09 mg/mm, 0.06 mg/mm, or the amount of the glue of the adhesive layer 30 may be may be larger than 0.25 mg/mm, such as 0.27 mg/mm, 0.30 mg/mm, etc.

[0026] In the following, the structure of the above embodiment is compared with the comparative example, wherein the present embodiment applies the battery shown in Fig. 1 in the present application, the flange portion 20 includes a protrusion segment 201 and an ending segment 202 simultaneously, and the amount of the glue of the adhesive layer 30 is controlled to 0.1 to 0.25 mg/mm; the structure of the battery of the comparative example is shown in Fig. 2, the flange portion 20' is perpendicular to the second plane 103' of the battery body 10'. Both batteries were simultaneously measured by a high-speed iron tensile machine with a peel strength greater than 12 N/8 mm and a relative humidity of 90% RH in the test environment. Specifically, the parameters and results of the two in the test are shown in Table 1.

Table 1

battery	storage time	width before storage	width after storage	width difference before and after storage
Present Embodiment	30 days	38.223 mm	38.225 mm	0.002 mm
Comparative Examples	30 days	38.240 mm	38.308 mm	0.068 mm

[0027] From the comparison of the above embodiment with the comparative example, it can be seen that the width difference of the battery in the present application before and after storage is smaller than that of the comparative example, indicating that the opening of the flange portion 20 is small. Obviously, the embodiment of the present application may better reduce the opening of the flange portion 20 compared with the comparative example. Among them, the width before (or after) storage in Table 1 refers to the dimension of the battery in the width **direction of the battery body 10 (10')**.

[0028] The foregoing is merely illustrative of the preferred embodiments of the present application and is not intended to be limiting of the present application, and various changes and modifications may be made by those skilled in the art. Any modifications, equivalent substitutions, improvements, and the like within the spirit and principles of the application are intended to be included within the scope of the present application.

CLAIMS

What is claimed is:

1. A battery, comprising:
an electrode body, and
a package, wherein the package comprises a first part covering the electrode body, and a second part protruding from the first part in a first direction, wherein the second part comprises a curved portion.
2. The battery according to claim 1, wherein
a projection of the first part in the first direction overlaps with a projection of the second part in the first direction.
3. The battery according to claim 2, wherein the projection of the second part in the first direction is located within the projection of the first part in the first direction.
4. The battery according to claim 2, wherein a projection of the first part in a second direction overlaps with a projection of the second part in the second direction, the second direction being perpendicular to the first direction.
5. The battery according to claim 1, wherein the first part comprises:
a first surface extending in the first direction;
a second surface extending in the first direction, wherein the second surface is opposite to the first surface in a second direction, the second direction being perpendicular to the first direction; and
a first side surface connecting the first surface and the second surface.
6. The battery according to claim 5,
wherein the second part comprises a first region comprising the curved portion, wherein the first region is connected to the first part.
7. The battery according to claim 6, wherein a projection of the first region in the second direction overlaps with a projection of the first part in the second direction.
8. The battery according to claim 6,
wherein the second part further comprises a second region, and a folded portion connecting the first region and the second region.
9. The battery according to claim 8, wherein a projection of the folded portion in the

second direction is located within a projection of the first region in the second direction.

10. The battery according to claim 8, wherein projection of the second region in the second direction is located within a projection of the first region in the second direction.

11. The battery according to claim 8, wherein a projection of the folded portion in the second direction and a projection of the second region in the second direction are located within projection of the first region in the second direction.

12. The battery according to claim 8, wherein a projection of the first region in the first direction is located within a projection of the first part in the first direction.

13. The battery according to claim 8, wherein a projection of the folded portion in the first direction is located within a projection of the first part in the first direction.

14. The battery according to claim 8, wherein a projection of the second region in the first direction is located within a projection of the first part in the first direction.

15. The battery according to claim 8, wherein a projection of the first region in the first direction and a projection of the folded portion in the first direction are located within a projection of the first part in the first direction.

16. The battery according to claim 8, wherein a projection of the first region in the first direction and a projection of the second region in the first direction are located within a projection of the first part in the first direction.

17. The battery according to claim 8, wherein a projection of the folded portion in the first direction and a projection of the second region in the first direction are located within a projection of the first part in the first direction.

18. The battery according to claim 8, wherein a projection of the first region in the first direction, a projection of the folded portion in the first direction, and a projection of the second region in the first direction are located within a projection of the first part in the first direction.

19. The battery according to claim 8,
wherein the second region comprises a first end portion connected to the folded portion,
and a second end portion opposite to the first end portion, and

wherein a projection of the second end portion in the first direction is located between
a central plane of the first part and a projection of the first surface in the first direction.

20. The battery according to claim 8, further comprising an adhesive layer.

21. The battery according to claim 20, wherein the adhesive layer is provided between the

first side surface and the second region in the first direction.

22. The battery according to claim 20, wherein the adhesive layer is provided between the first side surface and the first region in the first direction.

23. The battery according to claim 20, wherein the adhesive layer is provided between the first region and the second region in the first direction.

24. The battery according to claim 20, wherein the adhesive layer is provided between the first side surface, the first region and the second region in the first direction.

25. The battery according to claim 20, wherein a unit mass of the adhesive layer is 0.1 to 0.25 mg/mm in the second direction.

26. The battery according to claim 5, wherein at least one of the first surface or the second surface has a flat region in the first direction.

27. The battery according to claim 5,
wherein the first side surface faces to the second part in the first direction.

28. The battery according to claim 5, wherein the first side surface protrudes toward the second part in the first direction.

ABSTRACT

A battery including a battery body and a flange portion; the battery body includes a first side face protruding from a surface of the battery body; the flange portion is arranged outside the battery body and includes a protrusion segment connected to the battery body, the protrusion segment protruding away from the battery body.

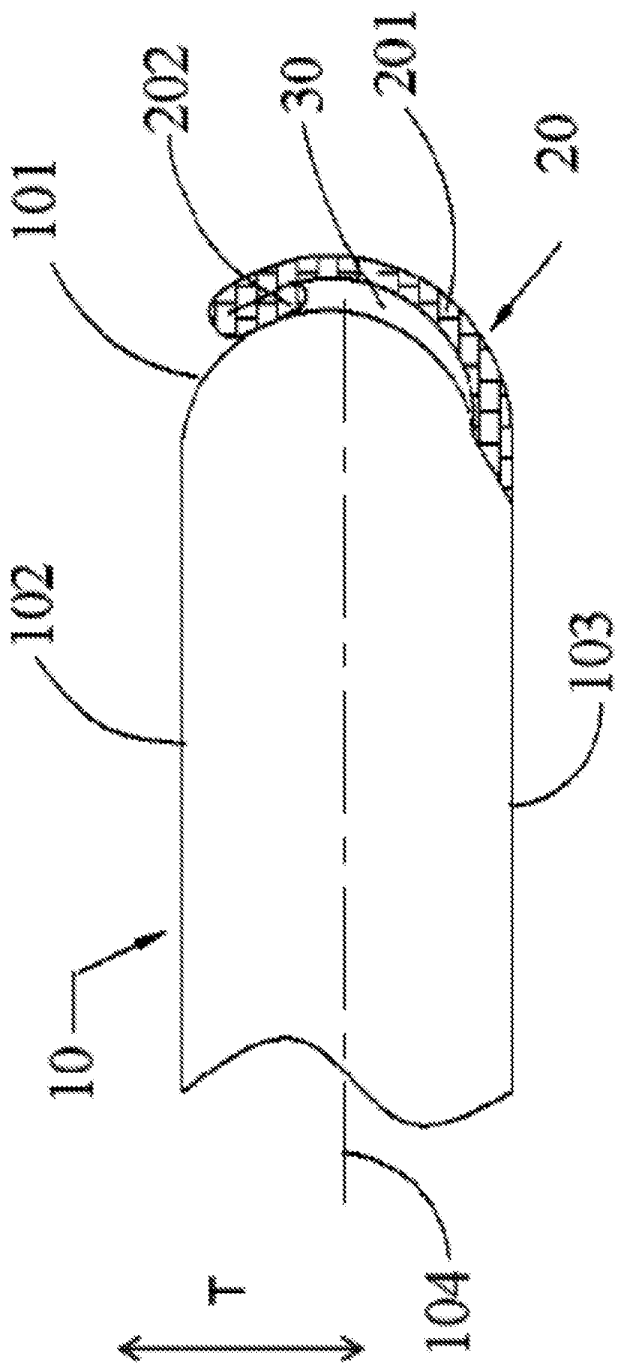


Fig. 1

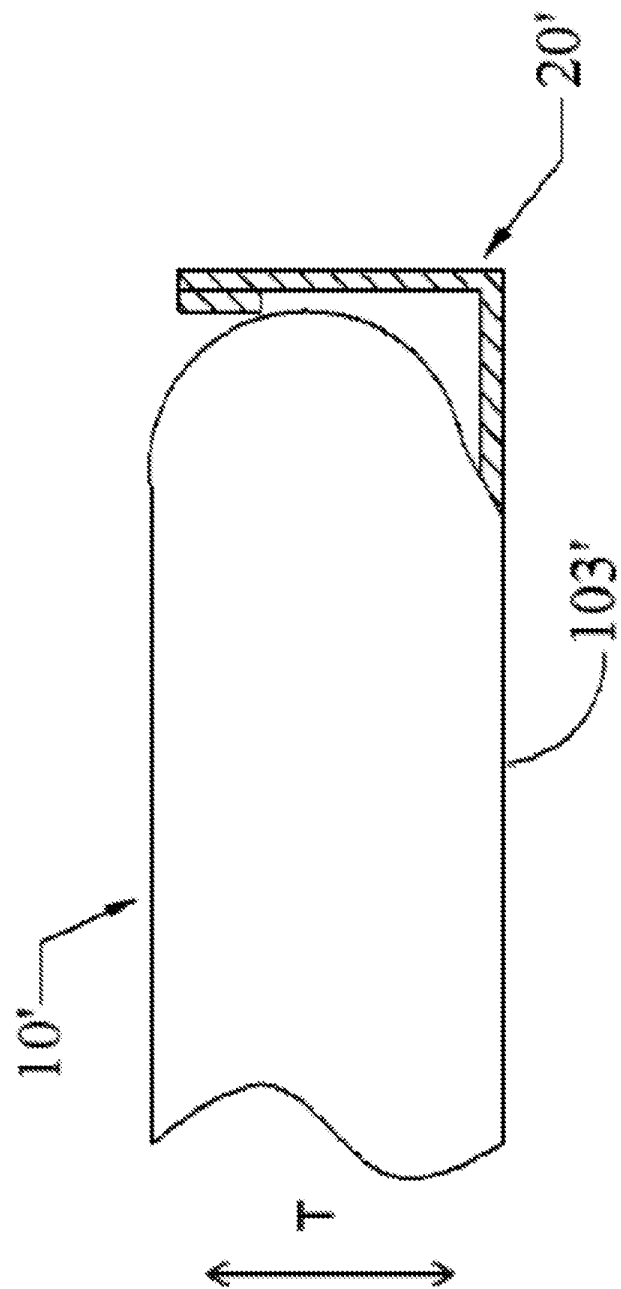


Fig. 2 (Prior Art)

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		BATTERY		
First Named Inventor/Applicant Name:		Bolin ZHOU		
Filer:		Yalei Sun/Cheryl Rogers		
Attorney Docket Number:		024607-02-5110-US		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	320	320
UTILITY SEARCH FEE	1111	1	700	700
UTILITY EXAMINATION FEE	1311	1	800	800
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	8	100	800
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2620

Electronic Acknowledgement Receipt	
EFS ID:	43240558
Application Number:	17374803
International Application Number:	
Confirmation Number:	5191
Title of Invention:	BATTERY
First Named Inventor/Applicant Name:	Bolin ZHOU
Customer Number:	24341
Filer:	Yalei Sun
Filer Authorized By:	
Attorney Docket Number:	024607-02-5110-US
Receipt Date:	13-JUL-2021
Filing Date:	
Time Stamp:	18:59:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$2620
RAM confirmation Number	E20217CI59352368
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		024607-02-5110-US_Application.pdf	3853538	yes	27
			507ebd83aa154f3c395c98493c75b665316706cc		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal of New Application		1	1	
	Fee Worksheet (SB06)		2	2	
	Application Data Sheet		3	9	
	Oath or Declaration filed		10	10	
	Assignee showing of ownership per 37 CFR 3.73		11	11	
	Power of Attorney		12	12	
	Internet Communications Authorized		13	13	
	Specification		14	21	
	Claims		22	24	
	Abstract		25	25	
	Drawings-only black and white line drawings		26	27	
	Warnings:				
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	36465	no	2
			1fb3486689d64bf8367c5a5e0f166daec7b0cdf2		
Warnings:					
Information:					

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.

**POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE
THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

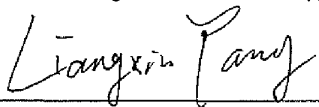
I hereby appoint the practitioners of Morgan, Lewis & Bockius LLP, Customer Number **24341** as attorneys or agents to represent the undersigned and to transact all business before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications and patents assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 C.F.R. § 3.73(c), said appointment to be to the exclusion of the inventor(s) and their attorney(s) in accordance with the provisions of 37 C.F.R. § 3.71, provided that, if any one of these attorneys ceases being affiliated with the law firm of Morgan, Lewis & Bockius LLP as partner, counsel, or employee, then the appointment of that attorney and all powers derived therefrom shall terminate on the date such attorney ceases being so affiliated.

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to the address associated with Customer Number **24341**.

Assignee Name and Address: **NINGDE AMPEREX TECHNOLOGY LIMITED**
No. 1, Xingang Road
Zhangwan Town, Jiaocheng Zone
Ningde City, Fujian Province
P.R. China 352100

SIGNATURE of Assignee of Record

The undersigned whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature			
Name	<u>Liangxin Yang</u>	Date	<u>Feb. 24th, 2021</u>
Title	<u>IP Manager</u>	Telephone	<u></u>

A copy of this form, together with a statement under 37 C.F.R. § 3.73(c) (Form PTO/SB96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 C.F.R. § 3.73(c) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee and must identify the application in which this Power of Attorney is to be filed.

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	024607-02-5110-US
		Application Number	
Title of Invention	BATTERY		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor 1					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Bolin		ZHOU		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Ningde	Country of Residence ⁱ	CN		
Mailing Address of Inventor:					
Address 1	No. 1, Xingang Road				
Address 2	Zhangwan Town, Jiaocheng Zone				
City	Ningde	State/Province	FJ		
Postal Code	352100	Country ⁱ	CN		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence information of this application.			
Customer Number	24341		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	BATTERY		
Attorney Docket Number	024607-02-5110-US	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	2	Suggested Figure for Publication (if any)	

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	024607-02-5110-US
		Application Number	
Title of Invention	BATTERY		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	24341		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	16166142	2018-10-21

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	024607-02-5110-US
		Application Number	
Title of Invention	BATTERY		

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
201721567327.2	CN	2017-11-17	8E4B
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	024607-02-5110-US
		Application Number	
Title of Invention	BATTERY		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	024607-02-5110-US
		Application Number	
Title of Invention	BATTERY		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.			
Applicant 1			
<p>If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.</p>			
<input type="button" value="Clear"/>			
☒ Assignee	☐ Legal Representative under 35 U.S.C. 117	☐ Joint Inventor	
☐ Person to whom the inventor is obligated to assign.		☐ Person who shows sufficient proprietary interest	
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:			
Name of the Deceased or Legally Incapacitated Inventor: <input type="text"/>			
If the Applicant is an Organization check here. ☒			
Organization Name	NINGDE AMPEREX TECHNOLOGY LIMITED		
Mailing Address Information For Applicant:			
Address 1	No. 1, Xingang Road		
Address 2	Zhangwan Town, Jiaocheng Zone		
City	Ningde	State/Province	FJ
Country ¹	CN	Postal Code	352100
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	024607-02-5110-US
		Application Number	
Title of Invention	BATTERY		

Assignee 1				
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
If the Assignee or Non-Applicant Assignee is an Organization check here. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.				

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Yalei Sun/		Date (YYYY-MM-DD)	2021-07-13
First Name	Yalei	Last Name	Sun	Registration Number
57765				
Additional Signature may be generated within this form by selecting the Add button.				

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	024607-02-5110-US
		Application Number	
Title of Invention	BATTERY		

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

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.

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)****Title of
Invention****BATTERY**

As the below named inventor, I hereby declare that:

This declaration
is directed to:

The attached application, or



United States application or PCT international application number _____

filed on: _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001
by fine or imprisonment of not more than five (5) years, or both.**WARNING:**

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTORInventor: Bolin ZhouDate (Optional): October 16, 2018Signature: Bolin Zhou

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

Electronically filed July 13, 2021

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Bolin ZHOU	Confirmation No.:	To be assigned
Serial No.:	To be assigned	Art Unit	To be assigned
Filed:	July 13, 2021	Examiner:	To be assigned
For:	BATTERY	Attorney Docket No.:	024607-02-5110-U S

STATEMENT UNDER 37 C.F.R. § 3.73(c)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

NINGDE AMPEREX TECHNOLOGY LIMITED, a corporation, states that it is the assignee of the entire right, title and interest in the patent application/patent identified above by virtue of an assignment from the inventor(s) of the parent of the patent application/patent identified above.

The assignment was recorded in the United States Patent and Trademark Office on October 22, 2018 at Reel 047247, Frame 0790, or for which a copy thereof is attached.

The undersigned is authorized to act on behalf of the assignee.

Date: July 13, 2021

/Yalei Sun/

57,765

Yalei Sun

(Reg. No.)

MORGAN, LEWIS & BOCKIUS LLP

1400 Page Mill Road

Palo Alto, CA 94304

(650) 843-4000

UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR § 1.53(b))</i>		Attorney Docket No. 024607-02-5110-US	
		First Inventor	Bolin Zhou
		Title	BATTERY
		Electronically filed	July 13, 2021
APPLICATION ELEMENTS <i>See MPEP Chapter 600 concerning utility patent application contents.</i>		Address to: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	
1. ☐ Fee Transmittal Form <i>(with duplicate for fee processing)</i> 2. ☐ Applicant claims Small Entity status, see 37 C.F.R. § 1.27 3. ☒ Specification [Total Pages 12] 4. ☒ Drawing(s) <i>(35 USC § 113)</i> [Total Sheets 2] 5. ☒ Oath or Declaration [Total Pages 1] a. ☐ Newly executed <i>(original or copy)</i> b. ☒ Copy from a prior application <i>(37 CFR § 1.63(d))</i> 6. ☒ Application Data Sheet, see 37 C.F.R. § 1.76 7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program <i>(Appendix)</i> ☐ Landscape Table on CD 8. ☐ Nucleotide and/or Amino Acid Sequence Submission <i>(if applicable, all necessary)</i> a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statement verifying identity of above copies		ACCOMPANYING APPLICATION PARTS 9. ☐ Assignment Papers <i>(cover sheet & document(s))</i> Name of Assignee: 10. ☒ 37 CFR § 3.73(c) Statement a. ☒ Power of Attorney 11. ☐ English Translation Document <i>(if applicable)</i> 12. ☐ Information Disclosure Statement and PTO-1449 a. ☐ Copies of citations attached 13. ☐ Preliminary Amendment 14. ☐ Return Receipt Postcard <i>(MPEP 503)</i> 15. ☐ Certified Copy of Priority Document(s) <i>(if foreign priority is claimed)</i> 16. ☐ Non-Publication Request under 35 U.S.C. § 122 (b)(2)(B)(i) 17. ☒ Other: Authorization for Internet Communication	
Note: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 MUST be included in an Application Data Sheet (ADS). (2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).			
19. CORRESPONDENCE ADDRESS: Customer Number 24341			
Signature	/Yalei Sun/		Date July 13, 2021
Name (Print/Type)	Yalei Sun		Registration No. (Attorney/Agent) 57,765

<p style="text-align: center;">UTILITY PATENT APPLICATION FEE TRANSMITTAL</p> <p><i>(Only for new nonprovisional applications under 37 CFR § 1.53(b))</i></p>	Attorney Docket No.		024607-02-5110-US
	First Inventor	Bolin Zhou	
	Title	BATTERY	
	Electronically filed	July 13, 2021	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

BASIC FILING, SEARCH AND EXAMINATION FEES - Undiscounted

Application Type	Filing Fees	Search Fees	Examination Fees	Fees Paid (\$)
Utility	\$ 320	\$ 700	\$ 800	\$ 1820

EXCESS CLAIM FEES

Type	No. Filed	Less	Extra	Extra Rate (\$)	Fee (\$)
Total Claims	28	- 20	8	\$ 100 each	800
Independent	1	- 3	0	\$ 480 each	0
Multiple Dependency Fee If Applicable (\$860)					800

APPLICATION SIZE FEE (Specification and Drawings)

Total Sheets	Extra Sheets	No. of each add'l 50 or fraction thereof	Fee (\$)
14 x .75- 100	/ 50	(round up to whole no.) x \$420	0

Sub Total	\$2,620
Other:	
TOTAL FILING FEE	\$2,620

Payment has been made via Financial Manager, however, the Director is hereby authorized to charge any required fees to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 024607-02-5110-US).

Respectfully submitted,

Date: July 13, 2021

/Yalei Sun/

57,765

Yalei Sun

(Reg. No.)

MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
(650) 843-4000