

In the Matter Of:

LG ENERGY SOLUTION vs MOLECULAR REBAR DESIGN

IPR2024-01011

YU ZHU

August 12, 2025



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Page 1 of 18 SOLUTIONS

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MRD EX. 2045
LGES v MRD
IPR2024-01013

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG ENERGY SOLUTION LTD)(
SAMSUNG ELECTRONICS CO LTD)(
SAMSUNG ELECTRONICS AMERICA INC)(
Petitioner,)(
VS.) (CASE IPR2024-01011
MOLECULAR REBAR DESIGN LLC) (U.S. PATENT 8,896,924
Patent Owner.) (

ORAL DEPOSITION OF

YU ZHU

August 12, 2025

(Reported Remotely)

ORAL DEPOSITION OF YU ZHU, produced as
a witness at the instance of the Patent Owner, and
duly sworn, was taken in the above-styled and numbered
cause on the 12th day of August, 2025, from 9:40 a.m.
to 9:52 a.m., before BROOKE SAWYER, CSR, in and for
the State of Texas, reported by oral stenograph, at
Akron, Ohio, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached herein.

A P P E A R A N C E S

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DANIEL JANG, Paralegal

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E X H I B I T S

(None marked.)

P R O C E E D I N G S

THE COURT REPORTER: We're on the record. Today's date is August 12th, 2025. The time is 9:40 a.m. Would counsel please state their appearance and affiliations, and I will swear in the witness.

MR. ZINDA: Stephen Zinda on behalf of the patent owner, Molecular Rebar.

MR. IN: Hyun Jin In on behalf of the petitioner, LG Energy Solution, here joined by Daniel Jang and Gretchen DeVries.

Yu Zhu,
having been duly sworn, testified as follows:

THE COURT REPORTER: Thank you.
Counsel, you may proceed.

EXAMINATION

BY MR. ZINDA

Q Dr. Zhu, you were just deposed in the IPR proceeding involving the 909 patent, correct?

A Yes.

Q Is there any reason that your answers would be different in this proceeding if I were to ask you the same questions again?

A They shouldn't.

Q Okay. Thank you. I'm trying to just save

1 us time, short circuit this a little bit. I wanted to
2 ask you about a few of the exhibits that were
3 referenced in your declaration in the 924 proceeding,
4 which is the proceeding that you're being deposed on
5 right now. Can I get you to pull out LGES 1032?

6 A LGES 1032. Yes. Just confirm this is
7 ChemComm paper from Zhou.

8 Q And can you provide in your own words a
9 summary of what this article is about?

10 MR. IN: Objection to form.

11 A Yeah. This article is -- is -- this article
12 is an abstract -- it's -- it's a novel composite
13 electrode structure with highly conductive
14 three-dimensional carbon nanotube network superimposed
15 into interlaced porous lithium iron phosphate medium,
16 and it was designed and realized using in situ
17 synthesis procedure. And they'll produce a
18 high-performance composite cathode for high-energy and
19 high-power lithium-ion batteries.

20 Q And is part of the process described in LGES
21 1032 calcination?

22 A Can you repeat the question again.

23 Q Sure. Is one of the steps that's performed
24 in this -- in LGES 1032 -- a calcination step?

25 A Yes. One of the steps is calcination.

1 Q Does LGES 1032 report the oxidation level
2 after the calcination step is performed?

3 A In this specific paper, they did not report
4 the oxidation level.

5 Q Okay.

6 A However, it does use oxidized carbon
7 nanotube.

8 Q Okay. And then if I could get you to go
9 to -- pull out Exhibit LGES 1040.

10 A Yes. I have this document.

11 Q And what is L -- what is LGES 1040?

12 A This is supplementary information for the
13 same document we just discussed, LGES 1032.

14 Q Okay. And does LGES 1040 report the oxygen
15 level -- I'm sorry. Does LGES 1040 report the
16 oxidation level after the calcination step of LGES
17 1032?

18 A It does not report the oxidation level after
19 the calcination, but it does use oxidized carbon
20 nanotube, as I mentioned.

21 Q Just give me one minute.

22 A In this paper. In this document.

23 Q One second. If I could get you to pull out
24 LGES 1041.

25 A Yes. Yeah. I opened it. 1041. Just make

1 sure this is a paper published on the Journal of
2 Nanomaterials.

3 Q Yes. That's correct. And it is entitled
4 Electrode Composite Lithium Iron Phosphate at Carbon
5 Structure. Do you see that?

6 A Yes.

7 Q Okay. So we're on the -- we've got the
8 right document. Can I get you to flip down to page 5
9 and, particularly, Figure 4. And my question is: Is
10 the purpose of Figure 4 to show that carbon remains
11 after the heating step?

12 A Figure 4 shows three figures. It's
13 basically, XPS data for the materials. There are
14 three different type of materials: LFP600, 700, and
15 800. And the data of the XPS spectrum's copy.

16 THE COURT REPORTER: I'm sorry. Mr.
17 In, did you have an objection prior to Dr. Zhu's
18 answer? You're muted, and I didn't hear you. But I
19 saw your mouth move.

20 MR. IN: Yeah. I had an objection to
21 form. Sorry about that.

22 Q Let me ask it a different way, Dr. Zhu.
23 What is the purpose of Figure 4, in your opinion?

24 A The purpose of the Figure 4 is the -- is --
25 is -- it's XPS data, so the XPS usually gives an

1 element to the information about the materials and
2 their binding status, so that is the purpose of the
3 figure.

4 Q So it is intended to show binding status,
5 not necessarily the amount of carbon or oxygen that
6 remains after heating?

7 A It shows both. It shows both the
8 carbon-oxygen content as well as their binding status.

9 So that being said, it not only shows the percentage
10 of the carbon and oxygen, but also it shows the
11 different bonding status between the carbon and
12 oxygen. So there may be different bond -- bond formed
13 between the carbon and the carbon-oxygen. It can also
14 provide this information.

15 Q Can I get you to pull out LGES 1042.

16 A 1042.

17 Q Let me pull it up myself. Let me know when
18 you have it handy.

19 A Yeah.

20 Q All right. And --

21 A 1042. I just want to make sure the document
22 is reference from Journal of Materials Chemistry A
23 with the title Synthesis of Porous Carbon Nanotubes
24 for Composite.

25 Q Correct.

1 A Right.

2 Q And if you can go down to page 3, the first
3 sentence.

4 A You mean page 3 is --

5 Q Page 3 of the PDF. The big --

6 A Page 3 of the PDF.

7 Q Yeah. Big numbers at the (cross-talk,
8 indiscernible).

9 A Okay. Yes. Page 3 of the PDF.

10 Q It refers to -- if you look at the second
11 sentence under 2.1 -- and it references AL203. Do you
12 see that?

13 A You mean the second sentence of --

14 Q Correct.

15 A -- paragraph 2.1?

16 Q Correct. It says (as read): The carbon
17 nanotubes were synthesized by chemical vapor
18 deposition.

19 You see that?

20 A Yes.

21 Q And then it --

22 A I saw that.

23 Q And it says -- and it references aluminum --
24 AL203, which is also known as alumina, correct?

25 A Alumina. Yeah. Alumina oxide.

1 Q Alumina oxide. Okay. And is that
2 considered -- is alumina oxide considered a
3 high-temperature material?

4 MR. IN: Objection to form.

5 A Alumina oxide in this experiment is used as
6 a substrate to supporting the growth of carbon
7 nanotube. The irony is a CAD, so the growth was
8 carried out in so-called chemical vapor deposition
9 technique.

10 Q Yeah. But my question specifically is
11 about -- is about the alumina oxide. Is that
12 considered to be a high-temperature material?

13 A I -- I do not quite understand your
14 question. What do you mean --

15 Q I guess --

16 A -- alumina oxide is a high-temperature
17 material? You mean the temperature of alumina oxide
18 is higher or some other -- what do you mean exactly?

19 Q Just strike the question. Just give me one
20 second. All right. I have no further questions.

21 A Okay.

22 MR. IN: No further questions from
23 Petitioner either.

24 MR. ZINDA: Okay. Were there any other
25 questions that you had about the terminology,

1 Ms. Sawyer?

2 THE COURT REPORTER: One second. Mr.
3 In, are you going to want to do read and signs for
4 both of the transcript?

5 MR. IN: No. I don't think so.

6 THE COURT REPORTER: And would you like
7 copies of either of them?

8 MR. IN: No. We're good here.

9 THE COURT REPORTER: We are off the
10 record at 9:52 a.m.

11 (End of testimony at 9:52 a.m.)
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Patent Owner.)(
(CASE IPR2024-01011
(U.S. PATENT 8,896,924

REPORTER'S CERTIFICATION
ORAL DEPOSITION OF
YU ZHU
August 12, 2025
(Reported Remotely)

I, BROOKE SAWYER, Certified Shorthand
Reporter in and for the State of Texas, hereby certify
to the following:

That the witness, YU ZHU, was duly sworn by
the officer and that the transcript of the oral
deposition is a true record of the testimony given by
the witness;

I further certify that pursuant to FRCP Rule
30(f)(1) that the signature of the deponent:

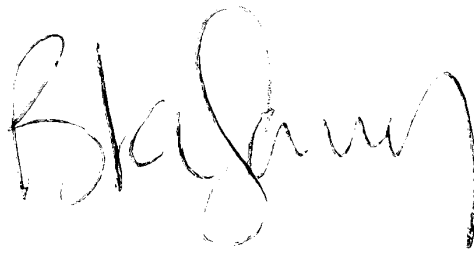
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party before the completion of the deposition and that
the signature is to be before any notary public and
returned within 30 days from the date of receipt of
the transcript. If returned, the attached Changes and
Signature Page contains any changes and the reasons

1 therefor;

2 __X__ was not requested by the deponent or a
3 party before the completion of the deposition.

4 I further certify that I am neither counsel
5 for, related to, nor employed by any of the parties or
6 attorneys in the action in which the proceeding was
7 taken, and further that I am not financially or
8 otherwise interested in the outcome of the action.

9
10 Certified to by me this 12th of August,
11 2025.

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16
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