

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG Energy Solution, Ltd.,
Petitioner,

v.

Molecular Rebar Design, LLC,
Patent Owner.

IPR2024-01005
Patent 9,636,649

**PATENT OWNER'S PRELIMINARY RESPONSE
TO PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 9,636,649**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	NO COMBINATION OF THE CITED REFERENCES TEACHES OR SUGGESTS EVERY LIMITATION OF ANY CHALLENGED CLAIM.....	3
A.	Claim Construction	3
B.	Person Of Ordinary Skill In The Art.....	4
C.	The '649 Patent	4
D.	The Cited References Lack “a plurality of oxidized, discrete carbon nanotubes” As Expressly Required In Claims 1 And 20	5
1.	The Sun primary reference (LGES-1004) in Grounds 1A- 1D lacks “a plurality of oxidized, discrete carbon nanotubes” as expressly required in Claims 1 and 20	6
2.	The Buretea (LGES-1005) secondary reference in Ground 1B for Dependent Claim 8 need not be addressed	11
3.	The Kaji (LGES-1006) secondary reference for Grounds 1C and 1D need not be addressed.....	11
4.	The Matsushita (LGES-1013) tertiary reference for Ground 1D need not be addressed	12
5.	The Farrugia primary reference (LGES-1007) in Grounds 2A and 2B lacks “a plurality of oxidized, discrete carbon nanotubes” as expressly required in Claims 1 and 20	12
6.	The Narayan secondary reference (LGES-1008) for Grounds 2A-2B lacks the claimed “aspect ratio of 25 to 500” and the combination would not be made with Farrugia	14
7.	The Nanya tertiary reference for Ground 2B (LGES- 1009) need not be addressed	16
E.	No Combination Of The Cited References Teaches Or Suggests Every Limitation Of Any Challenged Claim	16
III.	THE FINTIV FACTORS FAVOR DENIAL OF INSTITUTION UNDER § 314(a)	18
A.	Factor 1: A Stay Is Unlikely In The Parallel Proceeding.....	18

B.	Factor 2: The Median Time To Trial Is Before The Deadline For A Final Written Decision.....	19
C.	Factor 3: The Parties Have Invested Significant Time And Money In The Parallel Proceeding.....	19
D.	Factor 4: All Issues In The Petition Overlap With The Parallel Proceeding	20
E.	Factor 5: The Parties In Both Proceedings Are The Same	22
F.	Factor 6: Petitioner’s Arguments Do Not Plainly Lead To A Conclusion Of Unpatentability.....	22
IV.	CONCLUSION.....	24

TABLE OF AUTHORITIES**Page(s)****Cases**

<i>Apple Inc. v. Fintiv, Inc.</i> , IPR2020-00019, Paper 15 (PTAB May 13, 2020)	<i>passim</i>
<i>Commscope Technologies LLC v. Dali Wireless, Inc.</i> , IPR2022-01242, Paper 23 (PTAB Feb. 27, 2023)	22
<i>Ericsson Inc. v. Koninklijke KPN N.V.</i> , IPR2022-00069, Paper 9 (PTAB May 25, 2022)	20
<i>Exxon Chems. Patents, Inc. v. Lubrizol Corp.</i> , 64 F.3d 1553 (Fed. Cir. 1995)	2, 3, 9
<i>Graham v. John Deere Co.</i> , 383 U.S. 1 (1966)	16, 17
<i>KSR Int’l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007)	16
<i>In re Magnum Oil Tools Int’l, Ltd.</i> , 829 F.3d 1364 (Fed. Cir. 2016)	17
<i>Molecular Rebar Design, LLC et al v. LG Energy Solution, Ltd.</i> , 2-24-cv-00107, ECF No. 60 (E.D. Tex. July 19, 2024)	18
<i>SK Innovation Co., LTD v. LG Chem, LTD</i> , IPR2020-01239, Paper 14 (PTAB Jan. 12, 2021)	22
<i>Vector Flow, Inc. v. HID Glob. Corp.</i> , IPR2023-00353, Paper 8 (PTAB July 17, 2023)	22, 23

Statutes

35 U.S.C. § 103	16
35 U.S.C. §315(e)(2)	20

Other Authorities

Katherine K. Vidal, <i>Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation</i> (June 21, 2022).....	21, 22
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EXHIBIT LIST

Exhibit No.	Description
MRD-2001	Denial of Motion to Stay in parallel civil suit in EDTX
MRD-2002	Docket Control Order in parallel civil suit in EDTX
MRD-2003	File history excerpt from Sun (Office Action Response dated November 8, 2012)
MRD-2004	H. Golnabi, “Carbon nanotube research developments in terms of published papers and patents, synthesis and production,” <i>Scientia Iranica</i> , Vol. 19, Issue 6, Dec. 2012, pp. 2012-2022
MRD-2005	Excerpts from Defendants’ P.R. 3-3 Invalidity Contentions in parallel civil suit in EDTX

I. INTRODUCTION

Patent Owner Molecular Rebar Design, LLC (“MRD”) submits this Preliminary Response to the Petition by LG Energy Solution, Ltd. (“LGES”) seeking *inter partes* review of claims of U.S. Patent No. 9,936,649 (the “’649 Patent”). The Board should deny the Petition for multiple independent reasons, none of which can be cured by LGES.

First, the presented Invalidity Grounds fail to render the challenged claims obvious. That is, the prior art relied upon, alone and in combination, fails to teach or suggest each and every claim element.

The Petition includes two primary references—Sun and Farrugia. Both the Sun and Farrugia primary references are relied upon as purportedly disclosing a dispersion comprising “a plurality of oxidized, discrete carbon nanotubes” as expressly required in claims 1 and 20. However, neither has the claimed feature. Instead, the nanotubes in the Sun primary reference are not even an individual component, but rather are associated with nanoplatelets in the form of a nanofiller reaction product as opposed to discrete carbon nanotubes in a dispersion. Similarly, the Farrugia primary reference lacks “discrete carbon nanotubes” in a dispersion. Instead, Farrugia describes reaction products of carbon nanotubes covalently bonded to one or more monomers, which are then polymerized to form a composite resin.

It is black-letter patent law that a composition comprising a component, e.g., “Component A”, must include Component A and not some reaction product that results from a reaction of Component A with another component. *Exxon Chems. Patents, Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1557 (Fed. Cir. 1995) (holding that a chemical composition claimed in an ingredient-based form is not infringed when there is interaction between the ingredients after they have been combined). Both of Petitioner’s primary references have reaction products of carbon nanotubes with another component as opposed to the claimed “plurality of oxidized, discrete carbon nanotubes.” In fact, none of Petitioner’s references (alone or in combination) have a plurality of discrete carbon nanotubes in a dispersion. It cannot because the cited art, taken alone or in combination, fails to disclose this element. Because there is at least one claim element that is missing from each alleged obviousness ground, Petitioner has failed to meet its required preponderance burden to institute a trial for any challenged claim on any ground and institution should be denied.

Second, the Board should deny institution based on the *Fintiv* factors described in detail below. A district court trial will occur before a PTAB decision and a stay has already been denied. Moreover, judicial economy is best served by denying institution because Petitioner has presented a multitude of obviousness combinations in district court that will need to be addressed by the District Court since Petitioner has not offered a *Sotera* stipulation.

II. NO COMBINATION OF THE CITED REFERENCES TEACHES OR SUGGESTS EVERY LIMITATION OF ANY CHALLENGED CLAIM

As discussed below, none of the references in any of the grounds teach or suggest, either alone or in combination, each limitation of either independent claim 1 or independent claim 20, the only independent claims in the '649 Patent. Accordingly, the Board should deny instituting this IPR.

A. Claim Construction

No specific claim construction is needed for “discrete carbon nanotubes” in independent claims 1 and 20 because to deny institution the Board need only recognize that consistent with the ordinary practice for chemical claims “plurality of oxidized, discrete carbon nanotubes” are not reacted with other components. Instead, “discrete carbon nanotubes” exist separate from other claimed components in the dispersions like the additive in independent claims 1 and 20. *Exxon*, 64 F.3d at 1557-58. As described below in Sections II.B.1 and II.B.5, in regard to both primary references, Petitioner ignores its own various proposed constructions that dispersed “discrete carbon nanotubes” in independent claims 1 and 20 are “individually dispersed” and not reaction products of carbon nanotubes with another component as in Petitioner’s primary references.

For purposes of this Preliminary Response only, MRD interprets all other claim terms in accordance with their ordinary and customary meaning. MRD reserves the right to propose constructions and other arguments in this IPR, the

parallel litigations, or other proceedings involving the '649 Patent to the extent necessary to respond to constructions proposed by Petitioner or as required to respond to the facts or circumstances.

B. Person Of Ordinary Skill In The Art

For purposes of this Preliminary Response only, MRD does not dispute the Petition's definition of level of ordinary skill in the art. (Petition, p.5).

C. The '649 Patent

The only two independent claims of the '649 Patent pertain to dispersions comprising a plurality of oxidized discrete multiwall carbon nanotubes having an aspect ratio of 25 to 500 along with either an additive (claim 1) or a wax and a fluoroelastomer (claim 20). As the '649 Patent points out and Petitioner adopts, "discrete carbon nanotubes" include those that are "individually dispersed" in the claimed dispersion as opposed to aggregated, reacted, or otherwise associated with other materials. (Petition, pp.5, 13, 25, 26, 65).¹ The claimed dispersions are useful

¹ Petitioner's various "discrete" constructions include "generally individually distinct" on pages 5 and 13, "individually separated" on page 25, "generally individual, separated nanotubes" on page 65, and on page 26 that a "POSITA would have understood or found obvious that nanotubes that are generally individual and separated are not aggregated into a clump, and thus are free flowing particles, e.g.,

in making, for example, cathode or anode materials for lithium ion batteries used in cell phones (LGES-1050) in order to prolong battery life and/or reduce the battery charging time.

D. The Cited References Lack “a plurality of oxidized, discrete carbon nanotubes” As Expressly Required In Claims 1 And 20

The Petition alleges six invalidity grounds covering claims 1-23. *Ground 1A* is based on the alleged obviousness of claims 1-7, 11, 13-14, and 17-19 over Sun; *Ground 1B* is based on the alleged obviousness of claim 8 over Sun and Buretea; *Ground 1C* is based on the alleged obviousness of claims 9-10, 15, and 21-23 over Sun and Kaji; *Ground 1D* is based on the alleged obviousness of claims 16 and 20 over Sun, Kaji, and Matsushita; *Ground 2A* is based on the alleged obviousness of claims 1-8, 11-15, 17-19, and 21 over Farrugia and Narayan; and *Ground 2B* is based on the alleged obviousness of claims 22-23 over Farrugia, Narayan, and Nanya.

Claims 1 and 20 are the only independent claims. This response will focus on the deficiencies of Grounds 1A, 1D, and 2A as they relate to independent claims 1 and 20. As shown below, Petitioner cannot meet its preponderance burden on those grounds as to either independent claim. Accordingly, the Board need not address the dependent claims covered in subsidiary Grounds 1B, 1C, and 2B because those

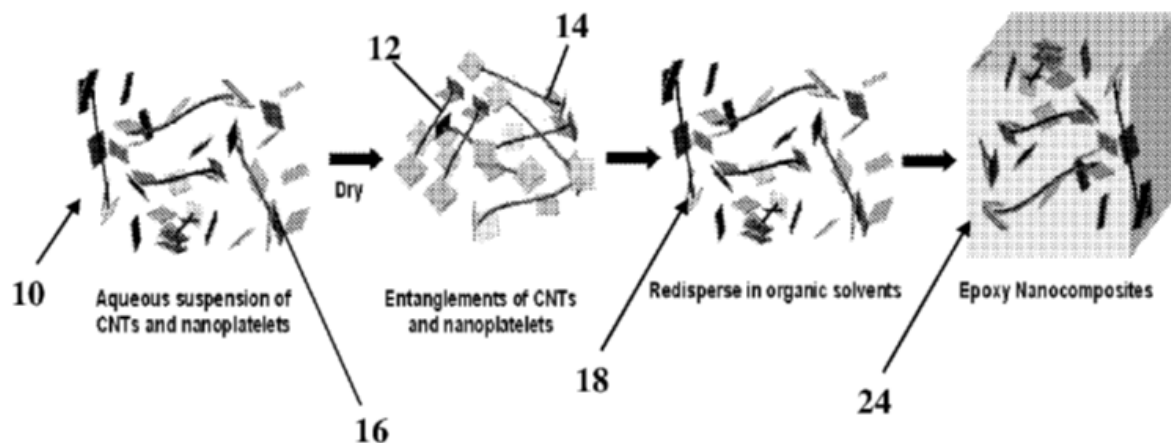
in that a given nanotube can flow freely relative to another nanotube in the dispersion.” (Petition, pp.5, 13, 25, 26, 65).

have at least the same deficiencies with regards to the primary references (i.e., Sun and Farrugia).

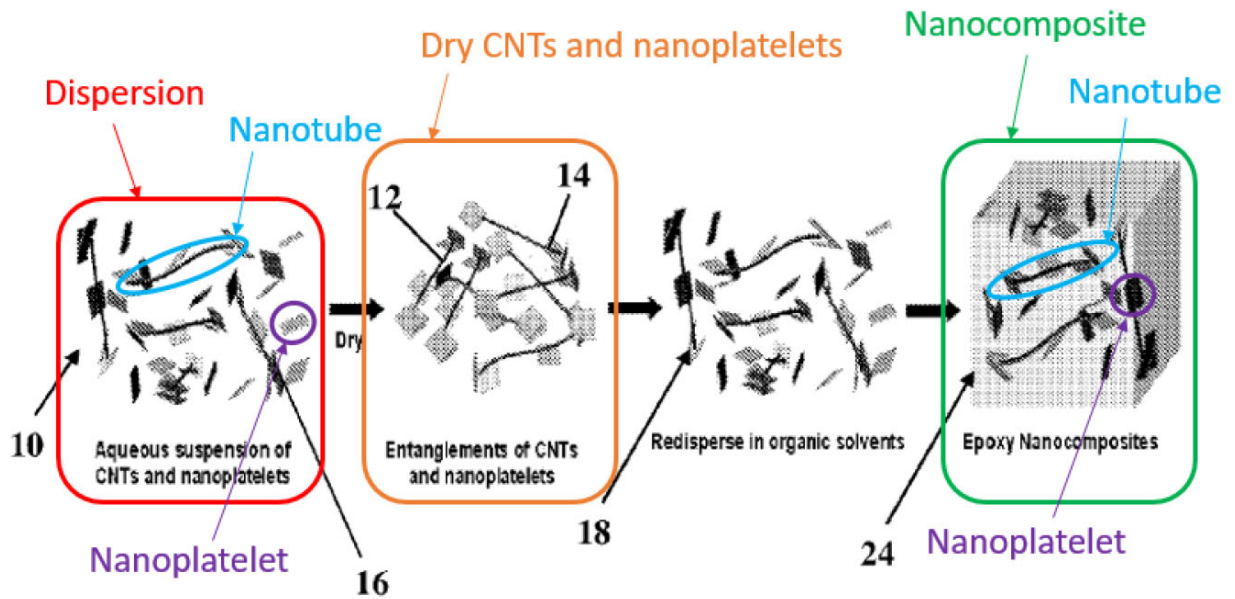
1. The Sun primary reference (LGES-1004) in Grounds 1A-1D lacks “a plurality of oxidized, discrete carbon nanotubes” as expressly required in Claims 1 and 20

Sun is the primary reference relied upon in Grounds 1A and 1D (and subsidiary Grounds 1B and 1C for dependent claims). Petitioner misunderstands Sun. That is, Petitioner uses a portion of Sun’s Figure 1 and then erroneously annotates the portion nine times (Petition, pp.7, 8, 9, 11, 15, 17, 20, 32, and 33) without providing the actual corresponding text from the specification.

The portion of Sun’s Figure 1 without Petitioner’s annotation is reproduced below.



Petitioner’s annotated Figure 1 (e.g., as shown on p.7 of the Petition) is reproduced below:



Sun, Fig. 1 (annotated)

(Petition, p.7). The Petition points to the bottom left of Figure 1 with reference numerals 10 and 16 four times and annotates it, without support, as a “dispersion” (*Id.*, pp.7, 11, 17, 32) even though it clearly is labelled as a “suspension,” and no evidence is presented to equate dispersions with suspensions. Petitioner then represents that the same bottom left depiction is somehow a dispersion of “nanotube” and “additive” and then alleges it is a dispersion of “nanotubes” and “filler” on page 32. (*Id.*, pp.17, 32).

Sun actually states that reference numeral 10 in the bottom left depiction is “dispersed nanotubes 12 and associated nanoplatelets 14.”² (LGES-1004, para. [0043], emphasis added). Sun continues that, “[t]he nanotube-nanoplatelet association comprises a nanofiller 16, as illustrated in Figure 1.” (*Id.*, para. [0045]). Since Sun’s nanotubes have “associated nanoplates 14” to form “a nanofiller 16,” they cannot be the “discrete carbon nanotubes” required by independent claims 1 and 20 even under Petitioner’s constructions.³ That is, despite saying “no formal claim constructions are necessary” (Petition, p.5), the “nanoplatelet associated” Sun nanotubes are not and cannot be “discrete” under any of the constructions offered up by Petitioner after first saying no constructions were necessary on page 5. (*Id.*).

Petitioner’s various proposed “discrete” constructions include “generally individually distinct” on pages 5 and 13, “individually separated” on page 25, “generally individual, separated nanotubes” on page 65, and on page 26 that a “POSITA would have understood or found obvious that nanotubes that are generally

² Sun states, “nanoplatelets attach to the nanotube walls, and at least partially enter between nanotubes of the bundles.” (LGES-1004, para. [0044]).

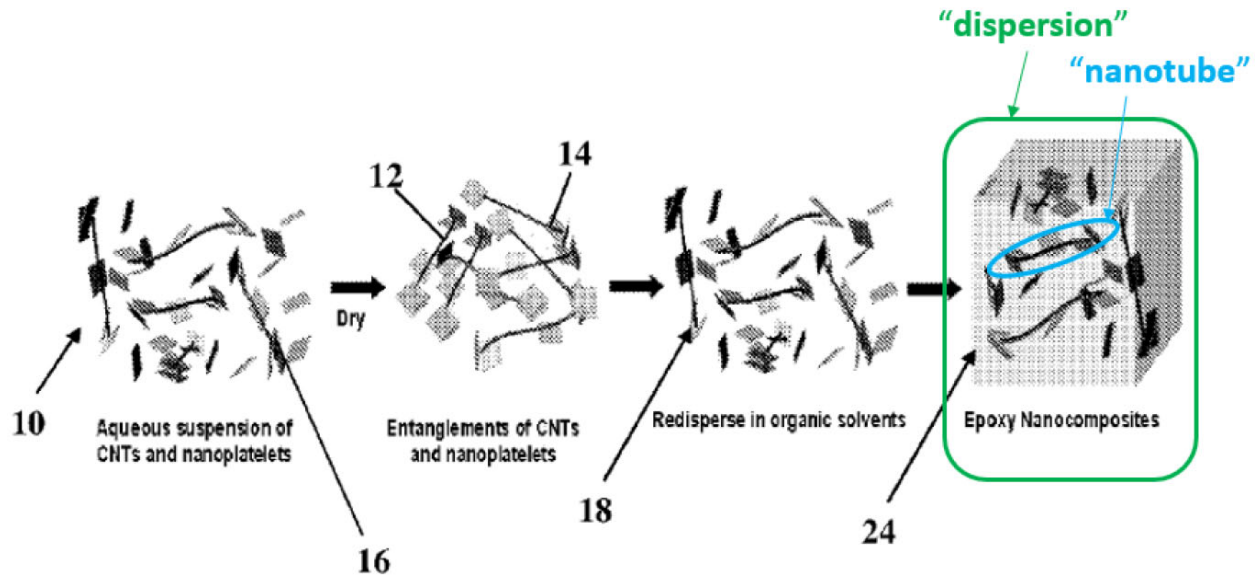
³ The Sun Patent Applicant, during prosecution of the Sun application, confirmed in an Office Action Response that Sun paragraph 43’s “associated nanoplates” were reacted by stating they were “chemically associated.” (MRD-2003, p.8).

individual and separated are not aggregated into a clump, and thus are **free flowing particles**, e.g., in that a given nanotube can flow freely relative to another nanotube in the dispersion.” (Petition, pp.5, 13, 25, 26, 65). Of course, Sun’s nanotubes that have “associated nanoplatelets 14” reacted to form “a nanofiller” reaction product are not “discrete” under any of Petitioner’s proposed constructions because the nanotubes are not individually dispersed or free flowing, but rather, reacted with nanoplatelets to produce a nanofiller.⁴ In contrast to Sun’s reacted (and therefore not separate) nanotubes in Sun’s reaction product, the ’649 Patent’s claimed “discrete carbon nanotubes” are unreacted and separate from other claimed components (like the additive) in the dispersions of independent claims 1 and 20. *See Exxon*, 64 F.3d at 1557-58.

Realizing the weakness of its annotated bottom left depiction in Sun’s Figure 1, Petitioner refers to the bottom right depiction of Figure 1 and states that, “[a]lternatively/additionally, Sun’s nanocomposite is a dispersion” and then Petitioner annotates the “epoxy nanocomposite” shown in Sun Figure 1 as somehow

⁴ The ’649 Patent describes the “discrete carbon nanotubes” as, for example, “individually dispersed”, “individualized carbon nanotubes”, “dispersed as individual nanotubes”, and “essentially discrete individual fibers, not entangled as a mass.” (LGES-1001, 3:9, 5:39-40).

being a “dispersion” with nanotubes on pages 9 and 15 of the Petition. (Petition, pp.9, 15).



(*Id.*, p.15).

However, epoxy nanocomposites 24 in Sun’s bottom right depiction are carbon nanotube reaction products and not dispersions with the ’649 Patent’s claimed “discrete carbon nanotubes.” As can be seen in Petitioner’s own annotation, the blue circled portion comprises a reaction product of three different components that is different than the claimed individual component in the ’649 Patent of “oxidized, discrete carbon nanotubes.” This is confirmed in Sun’s text where it says

that “[t]he nanofiller and epoxy mixture comprises a nanocomposite 24, or epoxy nanocomposite, as shown in FIG. 1.” (LGES-1001, para. [0046]).⁵

Thus, among other missing claimed items, nowhere in Sun is there any composition that comprises “a plurality of oxidized, discrete carbon nanotubes” as expressly required in claims 1 and 20 of the ’649 Patent. Thus, Ground 1A fails.

2. The Buretea (LGES-1005) secondary reference in Ground 1B for Dependent Claim 8 need not be addressed

The Board need not address Buretea at this time as it is only used in Ground 1B in relation to dependent claim 8. As described above, Grounds 1A and 1D, pertaining to the only independent claims, both fail due to deficiencies in the Sun primary reference.

3. The Kaji (LGES-1006) secondary reference for Grounds 1C and 1D need not be addressed

The Board need not address Kaji at this time as it is only used in Ground 1C for dependent claims and Ground 1D with the primary reference of Sun. As

⁵ Nanocomposites as in Sun are different from and are not the same as dispersions of carbon nanotubes. This is made clear in the ’649 Patent which states: “[t]his present invention relates to the carbon nanotubes as **composites** with materials such as elastomers, thermosets and thermoplastics **or** aqueous **dispersions** of open-ended carbon nanotubes with additives.” (LGES-1001, abstract) (emphasis added).

described above, Ground 1D, pertaining to the independent claim 20, fails due to deficiencies in the Sun primary reference.

4. The Matsushita (LGES-1013) tertiary reference for Ground 1D need not be addressed

The Board need not address Matsushita at this time as it is only used in Ground 1D with the primary reference of Sun. As described above, Ground 1D, pertaining to the independent claim 20, fails due to deficiencies in the Sun primary reference.

5. The Farrugia primary reference (LGES-1007) in Grounds 2A and 2B lacks “a plurality of oxidized, discrete carbon nanotubes” as expressly required in Claims 1 and 20

Farrugia is the primary reference relied upon in Ground 2A in combination with the secondary reference of Narayan. Like Sun, Farrugia does not pertain to any dispersion comprising “a plurality of oxidized, discrete carbon nanotubes” as claimed in independent claims 1 and 20 of the '649 Patent. Instead, Farrugia “is directed to toners comprising carbon nanotube/polymer composite resins.” (Ex. 1007, paragraph [0018]). As such, there are no oxidized, discrete carbon nanotubes present in Farrugia; rather, as explained below, Farrugia has reaction products of carbon nanotubes covalently bonded to one or more monomers, which are then polymerized to form the composite resin.

Farrugia states in paragraph [0020] that:

The carbon nanotube/polymer composite according to the present disclosure is formed by known means in the art. The carbon nanotubes

may be functionalized with one or more chemical moieties. The carbon nanotubes may be purified, if necessary, prior to functionalization. The chemical moiety on the carbon nanotubes generally covalently attach to a suitable monomer. The monomers then polymerize by any suitable means known in the art, thereby forming carbon nanotubes dispersed in a polymer matrix. This carbon nanotube/polymer composite resin can generally be incorporated into a toner.

(LGES-1007, para. [0020]). Thus, since Farrugia's carbon nanotubes react first with a suitable monomer to form a reaction product and then are polymerized, there is not "a plurality of oxidized, discrete carbon nanotubes" in a dispersion at any time. Instead, the nanotubes exist as nanotubes in a reaction product of nanotubes covalently bound to a monomer or in a polymeric composite that is formed by polymerizing the reaction product of nanotubes that were covalently bound to the monomer.⁶ Thus, Farrugia, like Sun, has carbon nanotube reaction products and not

⁶ Petitioner suggests that "the unpolymerized mixture that is cured to form the nanotube/polymer composite is a dispersion" on page 52 and then says on page 53 that is because "the nanotubes are dispersed in a molten mixture of monomer." However, Petitioner's expert admits the nanotubes in the unpolymerized mixture also have "first monomer covalently bonded to their side wall." (LGES-1003, para.

the '649 Patent's claimed dispersions with "a plurality of oxidized, discrete carbon nanotubes." As the Petition recognizes, Farrugia does not teach or suggest the "aspect ratio of 25 to 500" in independent claims 1 and 20. Thus, the Petition looks to combine Farrugia with Narayan to cure the deficiency as to the aspect ratio.

6. The Narayan secondary reference (LGES-1008) for Grounds 2A-2B lacks the claimed "aspect ratio of 25 to 500" and the combination would not be made with Farrugia

Unlike Farrugia's toners, Narayan pertains to electrically conductive polymeric foams for high strength electronics. (LGES-1008, abstract). Narayan is employed by Petitioner for its aspect ratio teachings in that Petitioner alleges the '649 Patent's 25-500 claimed aspect ratio "overlaps and falls within the ranges of aspect ratios described in Narayan (e.g., "greater than or equal to about 10, more preferably greater than or equal to about 100"). (Petition, p.58.). However, Petitioner's Narayan quote neglects the rest of Narayan's sentence about aspect ratio which says Narayan's aspect ratio is "even more preferably greater than or equal to about 1000." (LGES-1008, para.14.) Thus, the Petition does not explain how a POSITA gets from a most preferable aspect ratio of greater than 1000 in Narayan to the claimed range of 25-500.

218). Thus, it is also a reaction product and not the claimed discrete nanotubes in a dispersion.

Further, Narayan does not cure the deficiency explained above in regard to Farrugia's lack of "a plurality of oxidized, discrete carbon nanotubes" in Farrugia. Indeed, as Petitioner's expert states, "[t]he Farrugia-Narayan combination uses Farrugia's nanotube/polymer composite as the starting point." (LGES-1003, para.189). Thus, the combination still lacks a teaching or suggestion of "a plurality of oxidized, discrete carbon nanotubes" in a dispersion as expressly required in claims 1 and 20 since Farrugia's reaction product is missing the limitation.

What's more, the Farrugia and Narayan combination would not be made by a person of ordinary skill in the art. A POSITA reading Farrugia would not be led to look to Narayan or any other reference for an aspect ratio. That is, Farrugia does not teach or suggest any aspect ratio. Instead, Farrugia suggests that the specific carbon nanotube aspect ratio is not important because all carbon nanotubes have a suitably high aspect ratio sufficient for its toner purposes. Farrugia states, "[b]ecause carbon nanotubes have a high aspect ratio, only small amounts of carbon nanotubes need to be present in a toner in order to achieve the same conductivity as compared to conventional conductive additives." (LGES-1007, para. [0018]). Thus, a POSITA would not combine Farrugia and Narayan in the manner suggested by Petitioner.

7. The Nanya tertiary reference for Ground 2B (LGES-1009) need not be addressed

The Board need not address Nanya at this time as it is only used in Ground 2B with the primary reference of Farrugia for dependent claims 22-23. As described above, Ground 2A, pertaining to the independent claim 1, fails due to deficiencies in the Farrugia primary reference.

E. No Combination Of The Cited References Teaches Or Suggests Every Limitation Of Any Challenged Claim

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter, 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 said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved by the factual determinations of four factors: (1) the scope and content of the prior art; (2) differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art; and (4) when presented, objective evidence of nonobviousness, i.e., secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). It is well established that one (in this case, Petitioner) cannot satisfy its burden of proving obviousness by employing “mere conclusory statements,” but “must instead articulate specific reasoning, based

on evidence of record, to support the legal conclusion of obviousness.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

Here, Petitioner’s obviousness case fails on the first two *Graham* factors (the scope and content of the prior art and differences between the prior art and the claims at issue). As described above in Sections II.D.1 and II.D.5, neither of the two primary references (i.e., Sun and Farrugia) teach or suggest, either alone or in combination, “a plurality of oxidized, discrete carbon nanotubes” in a dispersion as recited in claims 1 and 20.

Sun at most discloses (1) reaction products of nanotubes and nanoplatelets and (2) nanocomposite reaction products. Farrugia discloses reaction products of carbon nanotubes covalently bonded to one or more monomers which are then polymerized to form the composite resin. But this is not what is claimed. Petitioner’s expert’s testimony cannot cure these deficiencies in the express disclosure of these references. The failure of Petitioner’s primary references to disclose the claimed embodiments for which Petitioner relies upon is fatal to the obviousness combinations. The cited secondary references fail to cure these deficiencies and Petitioner nowhere asserts that they do.

The obviousness combinations fail for at least the above reasons. The Petition fails to establish a reasonable likelihood that the claims are obvious over any of the asserted grounds. Thus, the Board should decline to institute this IPR.

III. THE *FINTIV* FACTORS FAVOR DENIAL OF INSTITUTION UNDER § 314(A)

As detailed below, the *Fintiv* factors favor denial.⁷

A. Factor 1: A Stay Is Unlikely In The Parallel Proceeding

The first factor favors denial, or is at most neutral, because there is presently no stay in the parallel proceeding before the Eastern District of Texas. To be fair, Petitioner filed a motion to stay the litigation after filing this Petition. The motion was denied without prejudice to refile after institution decisions. *Molecular Rebar Design, LLC et al v. LG Energy Solution, Ltd.*, 2-24-cv-00107, ECF No. 60 (E.D. Tex. July 19, 2024) (MRD-2001).

Thus, if the Board declines to speculate on the possibility of a stay following institution, this factor is—at most—neutral. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 at 12 (PTAB May 13, 2020). However, MRD notes that, at the institution stage, the case will be significantly into discovery, and the parties will have expended significant resources, such as completing invalidity contentions and the technical document production, and thus, this factor would shift to favoring denial. (See MRD-2002).

⁷As a threshold issue, Petitioner already addressed the factors in its Petition and should not be afforded an opportunity to reply to this response on this basis.

B. Factor 2: The Median Time To Trial Is Before The Deadline For A Final Written Decision

This factor favors denial because trial in the parallel district court proceeding is set for December 8, 2025 (MRD-2002), proximate an expected Final Written Decision if the IPR is instituted, as admitted by Petitioner. This proximity of these critical dates (i.e., the trial and a Final Written Decision) could result in conflicting decisions from the Board and the District Court, at nearly the same time, and the parties will have to proceed to the Federal Circuit, which will face potentially inconsistent decisions with different records and different findings. Combining this inefficiency with the other factors discussed herein, the Board should exercise its discretion to deny institution. *Fintiv*, Paper 11 at 9 (“If the court’s trial date is at or around the same time as the projected statutory deadline, the decision whether to institute will likely implicate other factors...”).

C. Factor 3: The Parties Have Invested Significant Time And Money In The Parallel Proceeding

This factor strongly favors denying institution, or is at most neutral. The parties are beginning to commit substantial resources to the parallel proceeding as discovery has begun in earnest, as noted above with respect to Factor 1. (*See* MRD-2002).

D. Factor 4: All Issues In The Petition Overlap With The Parallel Proceeding

This factor favors denial because “the same or substantially the same claims, grounds, arguments, and evidence” in this Petition are also at issue in the parallel litigation. *Fintiv*, IPR2020-00019, Paper 11 at 12. Thus, addressing these same issues here would duplicate efforts. Petitioner’s stipulation “not to seek resolution in the district court of the same grounds presented in this Petition” in the parallel litigation for instituted claims rings hollow. (Petition, p.79) Petitioner has not offered to withdraw ***all*** grounds/combinations based on these references or that it reasonably could have raised—i.e., the full scope of estoppel if this IPR proceeds to final written decision. 35 U.S.C. §315(e)(2).

Petitioner’s proposed stipulation here is the same narrow stipulation criticized in *Sand Revolution*, and even narrower than the “intermediate ground between the stipulations in *Sotera* and *Sand Revolution*” that “precludes Petitioner from relying in the district court on any of the same *references* used in the Petition, and is not limited to only the same *grounds*.” *Ericsson Inc. v. Koninklijke KPN N.V.*, IPR2022-00069, Pap. 9 at 12-14 (PTAB May 25, 2022) (emphasis in original). Unlike a *Sotera* stipulation where “a petitioner stipulates not to pursue in a parallel district court proceeding the same grounds as in the petition ***or any grounds that could have reasonably been raised in the petition,***” Petitioner’s proposed stipulation is limited only to the “same grounds” raised in the Petition and thus would not “mitigate[]

concerns of potentially conflicting decisions and duplicative efforts between the district court and the PTAB.” See Katherine K. Vidal, *Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation* (June 21, 2022) (“Vidal Memo”) at 7 (citing *Sotera*).

Further, Petitioner (as Defendant in the parallel litigation) has served extensive invalidity contentions. Petitioner’s narrow stipulation detailed above does nothing to narrow the case for the Court. Given the timing of the litigation, as discussed above in Factor 2, and that a stay is not likely (Factor 1), the Court is already forced to consider almost the full range of invalidity contentions served by Defendant that includes numerous invalidity references, and even more combinations, as the litigation proceeds to trial. (See MRD-2005, excerpts from invalidity contentions, served by Petitioner, as Defendant, in the parallel litigation showing the vast number of references relied upon). Thus, the Board spending its finite resources on this IPR that will only resolve, at most, two grounds of the multitude of invalidity positions taken in the parallel litigation, is not judicially effective or efficient.

Thus, the Board should exercise its discretion to deny institution here where Petitioners’ proposed stipulation fails to cover the full scope of statutory estoppel.

E. Factor 5: The Parties In Both Proceedings Are The Same

This factor weighs in favor of denying institution because “petitioner and the defendant in the parallel proceeding are the same party.” *Fintiv*, IPR2020-00019, Paper 15 at 15; *see also SK Innovation Co., LTD v. LG Chem, LTD*, IPR2020-01239, Paper 14 at 20-21 (PTAB Jan. 12, 2021).

F. Factor 6: Petitioner’s Arguments Do Not Plainly Lead To A Conclusion Of Unpatentability

Given that the first five factors favor denial of institution, the Board must consider whether a compelling invalidity case is presented. *See, e.g., Commscope Technologies LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 at 5 (PTAB Feb. 27, 2023). Critically, “the compelling merits standard is a higher standard than the standard for institution set by statute.” *Id.* at 3; *see also* Vidal Memo at 4 (“Compelling, meritorious challenges are those in which the evidence, if unrebutted in trial, would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence.”); *Vector Flow, Inc. v. HID Glob. Corp.*, IPR2023-00353, Paper 8 at 25 (PTAB July 17, 2023) (“A conclusion of unpatentability cannot ‘plainly’ follow from an analysis that declines to offer nothing more than ‘possibilities’ as how the claims might be understood.”); *see also* Vidal Memo at n.6.

Here, Petitioner does not present a compelling invalidity challenge sufficient to outweigh the preceding five factors as MRD has demonstrated herein. Petitioner’s

Grounds all rely upon obviousness. Petitioner has done exactly what the Board noted in *Vector Flow* is insufficient—offer nothing more than possibilities and assumptions on how the cited art might be combined given the lack of disclosure of the recited element of “a plurality of oxidized, discrete carbon nanotubes” in independent claims 1 and 20, as described above in Section II.D. As described above in Section II.E, the combinations of cited art presented in the Petitioner’s Invalidity Grounds fail to present a *prima facie* case of obviousness because the combinations, even if made, lack claimed elements. Given this, Petitioner does not even meet the reasonable likelihood of success standard for institution (as explained above), and therefore it cannot meet the significantly higher standard for a compelling invalidity challenge.

Further it is telling that Petitioner was unable to find even a single reference that expressly recited the claim element of “a plurality of oxidized, discrete carbon nanotubes.” In a period from 2000-2010 alone, there were over 52,000 papers published and over 5,000 patents issued in the area of research and development of carbon nanotubes. (MRD-2004) (“Progress of carbon nanotube (CNT) research and development in terms of published papers and patents is reported . . . Publication growth of CNTs and related fields are analyzed for the period of 2000–2010. From the explored search term, “carbon nanotubes”, the total number of papers containing the CNT concept is 52,224, and for patents is 5,746.”). Given this vast

array of potential prior art, if Petitioner was unable to find any art on point for the claimed elements, this points towards the non-obviousness of the '649 Patent. Petitioner's cobbling together of disparate references and having an expert opine on such meeting each and every claim element (when in fact the references do not) is further weakened by this data on the breadth of information available in the carbon nanotube technology area.

Accordingly, this factor favors denying institution.

IV. CONCLUSION

The Board should deny institution.

Dated: September 20, 2024

Respectfully Submitted,
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CERTIFICATE OF WORD COUNT

The undersigned certifies pursuant to 37 C.F.R. § 42.24(d) that the foregoing Patent owner Preliminary Response excluding any table of contents, table of authorities, certificates of service or word count, or appendix of exhibits or claim listing, contains 5,707 words according to the word-processing program used to prepare this paper (Microsoft Word). Petitioner certifies that this Patent Owner Preliminary Response does not exceed the applicable type-volume limit of 37 C.F.R. § 42.24(b)(1); that is, a 14,000 word limit.

Dated: September 20, 2024

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e)(4), lead counsel for Patent Owner hereby certifies that on September 20, 2024, a copy of this PATENT OWNER'S PRELIMINARY RESPONSE was served to the email correspondence addresses of record for Petitioner's counsel of record:

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