

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ZHUHAI COSMX BATTERY CO., LTD.,
Petitioner

v.

NINGDE AMPEREX TECHNOLOGY LTD.,
Patent Owner

IPR2023-00585
Patent 11,329,352

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

I.	INTRODUCTION	2
II.	BACKGROUND	4
	A. Technology Overview	4
	B. The '352 Patent	11
III.	LEGAL STANDARDS	13
IV.	LEVEL OF ORDINARY SKILL IN THE ART	13
V.	CLAIM CONSTRUCTION	14
VI.	THE BOARD SHOULD NOT INSTITUTE INTER PARTES REVIEW ON THE MERITS	14
	A. Ground 1: Wang and Deng Do Not Render Obvious Claims 1-3 and 9-12	15
	1. The Petition Fails to Show That Wang and Deng Render Obvious Claim 1	16
	a. Deng's "Notch 2" Is Not "A First Electrode Tab Receiving Groove" or "A First Electrode Plate Notch"	16
	b. A POSITA Would Not Have Combined Wang and Deng	20
	(i) Deng Is Not a Lithium-Ion Battery	23
	(ii) Deng's Heat Mitigation Technique is not Reasonably Pertinent to Lithium-Ion Batteries	26
	c. Petitioner's Proposed Modification Would Render Wang's Current Collector Susceptible to Damage and Tearing	30

d.	Even if Wang and Deng Were Combined as Proposed by Petitioner, the Resulting Notch Would Not Disclose the Claimed First Electrode Plate Notch.....	32
2.	Claims 2-3 and 5-12 Are Not Unpatentable	35
B.	Ground 2: Wang and Zhou Do Not Render Obvious Claims 1-3 and 9-12	35
1.	Petitioner Fails to Show That Wang and Zhou Render Obvious Claim 1	35
a.	Wang Creates Its Grooves By Patch Coating, Obviating the Need for the Claimed First Electrode Plate Notch.....	36
b.	A POSITA Would Not Have Combined Wang and Zhou	42
(i)	Zhou Does Not Disclose a First Electrode Tab Receiving Groove or First Electrode Plate Notch	44
(ii)	Zhou's Burrs Present a Separate and Distinct Problem From The Problem Solved by the '352 Patent and The Disclosure of Wang	54
(iii)	A POSITA Would (and Could) Not Etch Only a Select Area of Wang's Current Collector Using Zhou's Gas Plasma Etching to Form the Claimed First Electrode Plate Notch	57
c.	Even Assuming a POSITA Would Combine Wang and Zhou as Petitioner Proposes, the Resulting Structure Does Not Disclose the First Electrode Plate Notch.....	59
2.	Claims 2-3, and 5-12 Are Not Unpatentable	65

VII. THE BOARD SHOULD NOT INSTITUTE INTER PARTES REVIEW UNDER § 314(a) BASED ON THE <i>FINTIV</i> FACTORS	65
VIII. CONCLUSION.....	69

TABLE OF AUTHORITIES

	Page(s)
CASES	
<i>Apple v. Fintiv, Inc.</i> , IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020)	4, 65
<i>Commscope Techs. LLC v. Dali Wireless, Inc.</i> , IPR 2022-01242, Paper 23 (P.T.A.B. Feb. 27, 2023)	69
<i>Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.</i> , 800 F.3d 1375 (Fed. Cir. 2015)	15
<i>EClinicalWorks, LLC v. Decapolis LLC</i> , IPR2022-00229, Paper 10 (P.T.A.B. Apr. 13, 2022)	66
<i>In re Bigio</i> , 381 F.3d 1320 (Fed. Cir. 2004)	23
<i>In re Clay</i> , 966 F.2d 656 (Fed. Cir. 1992)	27
<i>In re GPAC Inc.</i> , 57 F.3d 1573 (Fed. Cir. 1995)	23
<i>In re ICON Health and Fitness, Inc.</i> , 496 F.3d 1374 (Fed. Cir. 2007)	27
<i>In re Klein</i> , 647 F.3d 1343 (Fed. Cir. 2011)	26
<i>Microsoft Corp. v. Secure Web Conf. Corp.</i> , IPR2014-00745, Paper 12 (P.T.A.B. Sept. 29, 2014)	13
<i>Roku, Inc. v. IOENGINE, LLC</i> , IPR2022-01553, Paper 11 (P.T.A.B. May 5, 2023)	66
<i>Samsung Elecs. Co., Ltd. v. California Inst. of Tech.</i> , IPR2023-00130, Paper 10 (P.T.A.B. May 4, 2023)	66, 68
<i>Sand Revolution II LLC v. Continental Intermodal Grp. – Trucking LLC</i> , IPR2019-01393, Paper 24 (P.T.A.B. June 16, 2020)	65

<i>Synopsys, Inc. v. Mentor Graphics Corp.</i> , IPR2012-00041, Paper 16 (P.T.A.B. Feb. 22, 2013).....	13
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<i>Wowza Media Sys., LLC v. Adobe Sys. Inc.</i> , IPR2013-00054, Paper 12 (P.T.A.B. April 8, 2013)	13
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RULES

Fed. R. Civ. P. 30(b)(6).....	67
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STATUTES

35 U.S.C. § 316(e)	15
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TABLE OF EXHIBITS

Exhibit Number	Description
2001	Declaration of James L. Kaschmitter in Support of Patent Owner's Preliminary Response
2002	Resume of James L. Kaschmitter
2003	Papers and Presentations of James L. Kaschmitter
2004	Melissa Morris & Sabri Tosunoglu, <i>Comparison of Rechargeable Battery Technologies</i> , ASME Early Career Technical J. (2012).
2005	S. Shawn Lee, Tae H. Kim, S. Jack Hu, Wayne W. Cai, & Jeffrey A. Abell, <i>Joining Technologies for Automotive Lithium-ion Battery Mfg. – A Rev.</i> , ASME 2010 International Mfg. Sci. and Eng'g Conf. (2010).
2006	David L. Wood, Jianlin Li, & Claus Daniel, <i>Prospects for Reducing the Processing Cost of Lithium Ion Batteries</i> , 275 J. of Power Sources (2015).
2007	<i>IEEE Standard for Rechargeable Batteries for Multi-Cell Mobile Computing Devices</i> , 1625 IEEE Power & Energy Society (2008).
2008	Michael Fetcenki & John Koch, LINDEN'S HANDBOOK OF BATTERIES, Ch. 22, NICKEL-METAL HYDRIDE BATTERIES (Thomas B. Reddy & David Linden, 4 th ed. 2011).
2009	Hunan Keba Layout Hybrid Electric Vehicle and High Power Application Mkt., https://www.large.net/news/70u43nw.html (last visited on July 12, 2023).
2010	Ningde Amperex Technology Ltd.'s Amended Complaint filed in <i>Ningde Amperex Tech. Ltd. v. Zhuhai CosMX Battery Co., Ltd.</i> , Civ. No. 2:22-cv-00232-JRG (E.D. Tex. July 20, 2023).

I. INTRODUCTION

Ningde Amperex Technology Ltd. (“ATL” or “Patent Owner”) respectfully submits this Preliminary Response to the Petition for *inter partes* review filed by Petitioner Zhuhai CosMX Battery Co., Ltd. (“Petitioner” or “CosMX”). Paper 1 (“Pet.”). The Petition seeks *inter partes* review (“IPR”) of claims 1-3 and 5-12 (the “Challenged Claims”) of U.S. Patent No. 11,329,352 (the “352 Patent,” Ex. 1001). The Petition should be rejected and institution should be denied for numerous reasons.

Petitioner relies on Wang as a primary reference in both of its grounds of unpatentability with respect to Claim 1. Wang discloses a lithium-ion battery comprising a current collector, where the active material of an electrode is “patch” coated on the current collector of the electrode by leaving certain “island areas” uncoated, and an electrode tab is joined to the current collector by ultrasonic welding. However, a person of ordinary skill in the art (“POSITA”) would understand that patch coating would not result in burrs and that Wang’s ultrasonic welding would not result in excessive heat. A POSITA thus would therefore have had no reason to look to secondary references Deng and Zhou, and the Petition fails to otherwise provide reasons to justify combining these references.

Deng comes from the unrelated field of flat metal plate type batteries and relies on resistance welding to internally weld an electrode tab to an electrode plate

using a high current. A POSITA would have understood that resistance welding would not be used in lithium-ion batteries like Wang's, which typically employ thin aluminum and copper current collectors and that, in fact, the high temperature and high current from resistance welding would destroy the current collectors in Wang's battery. A POSITA using Wang's design would therefore have had no reason to look to Deng, which addresses deformation in a welding area from heat and stress accumulation caused by resistance welding. Moreover, Deng's notch cannot be the '352 Patent's claimed notch or groove because Deng's notch does not "*receiv[e]* the electrode tab" as claimed but instead is specifically designed to run perpendicular to a joined tab and welding direction.

Zhou fares no better. Petitioner's reliance on Zhou is premised on unsupported and heavily modified figures that require the Board to find a groove and notch present even though neither are disclosed in Zhou. Further, after the extensive modifications proposed by Petitioner, Petitioner overlooks that the current collector is etched away along its *entire length* resulting in the fictional notch drawn by Petitioner *not* "extending through the second surface and the first surface of the first current collector" or "disposed on a side edge of the first electrode tab receiving groove" that is "defined by an exposed portion of the *first surface of the first current collector*" as claimed.

Independently, the Petition should be denied under § 314(a) based on the *Fintiv* factors because, in the remaining¹ district court case where the '352 Patent is at issue, trial is scheduled to happen about nine months *before* the statutory final written decision deadline in this proceeding, the parties will have expended significant effort by the expected institution decision date, no stipulation has been entered, and the Petition is weak.

As such, the Board should deny institution because Petitioner has not met its burden of demonstrating that it is more likely than not that any claim of the '352 Patent is unpatentable and because denial is warranted in the interests of efficiency and fairness.

II. BACKGROUND²

A. Technology Overview

Secondary or rechargeable batteries can be generally classified into five types: lead-acid batteries, alkaline batteries (including nickel-iron, nickel-cadmium,

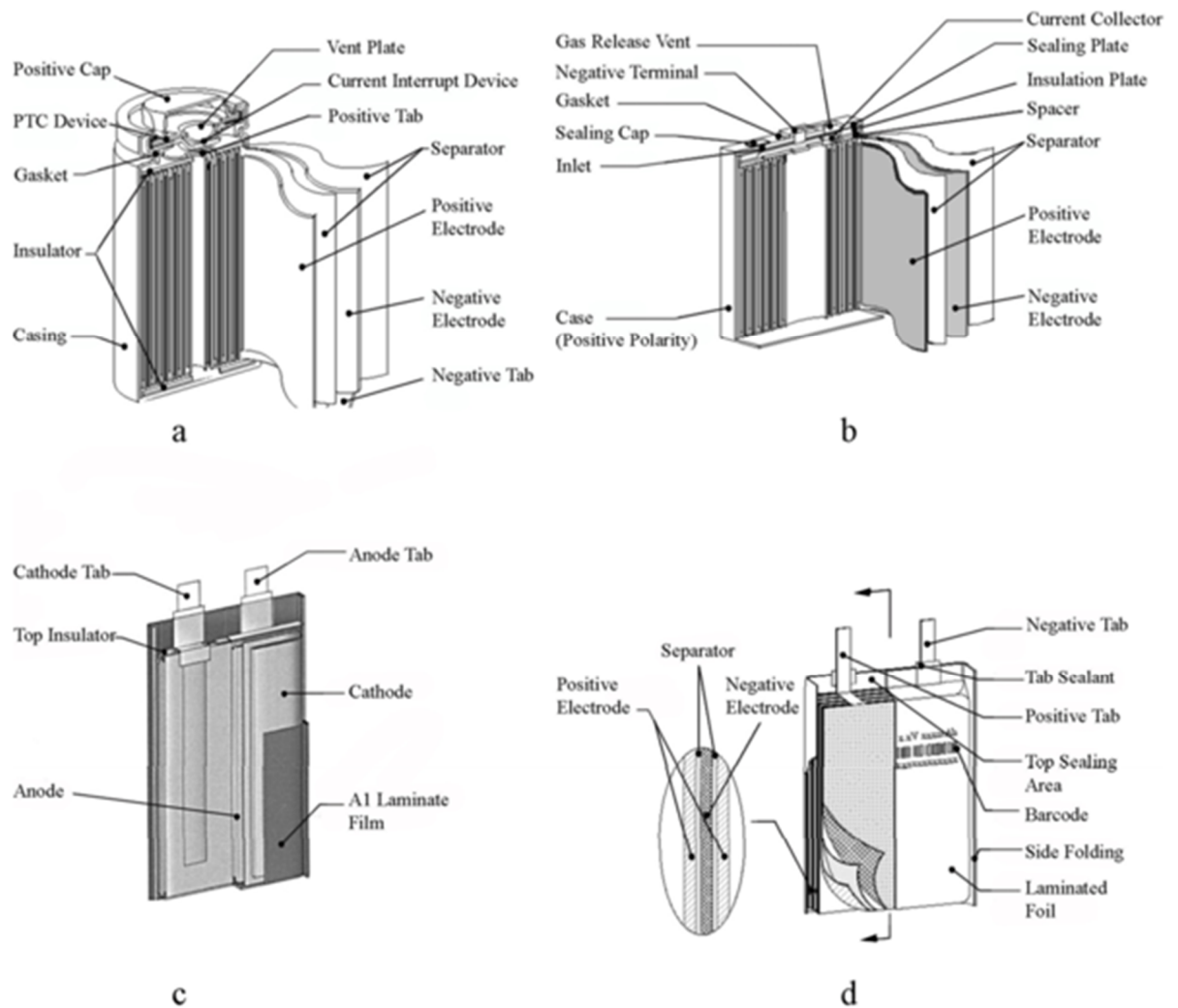
¹ The district court case previously pending in N.D. Cal. has now been voluntarily dismissed, so only the E.D. Tex. case remains.

² Patent Owner's expert James L. Kaschmitter provided a technology overview of secondary battery types and manufacturing considerations and a summary of the

nickel-hydrogen, nickel-zinc, and nickel-metal-hydride batteries, and rechargeable alkaline batteries), lithium batteries, sodium batteries, and flow batteries. *See, e.g.*, Ex. 2004 at 2-6. While each battery cell in these different types of secondary batteries operates under the same general principle of converting ion transfer energy (chemical energy) into electron transfer energy (electrical energy) through an anode, cathode, and electrolyte, they employ different materials, structures, and designs. *Id.*

Lithium-ion batteries can have different cell structures or “formats,” such as the cylindrical (a), prismatic (b), pouch (c), and stacked (d) formats shown below, each of which may employ different types of internal welding mechanisms.

³⁵² Patent, which are largely reproduced here for convenience. Ex. 2001, § IV.A-B.



Ex. 2007, Fig. 3

The lithium-ion battery cell formats shown above were typical of small battery cells at the time of the priority date of the '352 Patent. These lithium-ion battery cell formats employed very thin electrode current collectors with thicknesses that ranged from around 9 μm to 15 μm . *See, e.g.*, Ex. 2006 at 236-37 (describing exemplary “standard current collector thicknesses of 9 μm for the anode Cu foil and 15 μm for the cathode Al foil”).

For applications and battery types that required higher capacities, “large prismatic” cell formats were often used, particularly for lower energy density chemistries such as nickel-based alkaline cells, such as the example nickel metal hydride (NiMH) cell shown below.

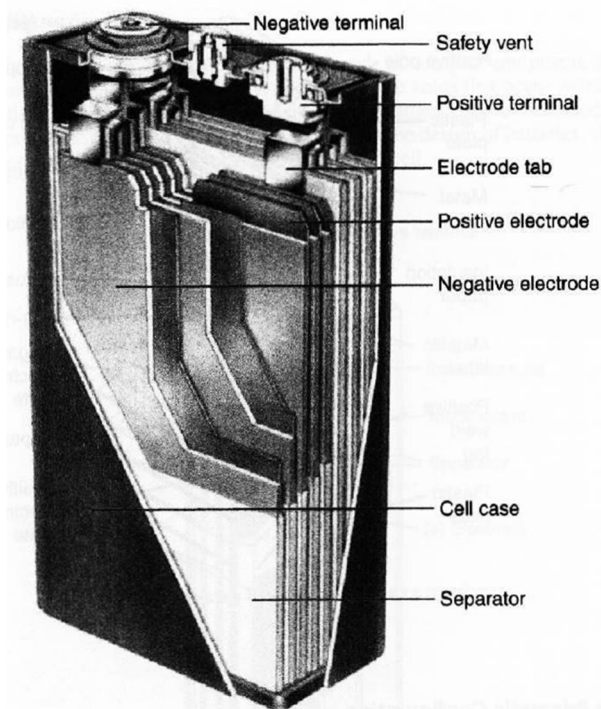


FIGURE 22.10 Cutaway view of a prismatic NiMH cell.

Ex. 2008, Fig. 22.10.

Each of these types of batteries requires various tab junctions, including electrode-to-tab and tab-to-tab joining or welding. For example, a secondary lithium-ion battery pack for electric vehicles typically consists of a large number of battery cells, sometimes several hundreds, even thousands, to meet desired power and capacity needs. Ex. 2005 at 1. Several cells are usually joined together to form a

module, and in typical implementations, there are tens of modules in a battery pack. *Id.* Meanwhile, each cell within a lithium-ion battery requires joining between at least one electrode tab and one electrode. As a result, a significant amount of joining, such as welding, both internally within a cell between electrode tabs and electrodes (“internal welding”), and externally between different cells (“external welding”), is needed to deliver electricity in a battery pack. *Id.*

There are different types of joining methods and techniques for internal welding, including resistance welding, laser welding, ultrasonic welding, and mechanical joining. *Id.* at 2. However, a POSITA would understand that joining methods are very particular to battery types and formats and not all joining methods can be used in each battery type or format.

One joining method discussed herein is resistance welding. Resistance welding relies on the electrical resistance at the metal interface to cause a localized heating and fusion of materials. Ex. 2005 at 2. A POSITA would understand that resistance welding is not used and cannot be used for internal welding of the thin current collectors in certain battery types, such as lithium-ion batteries, which rely on materials such as aluminum and copper for their electrode current collectors and tabs, because aluminum and copper have high thermal and electrical conductivities and low melting points. *Id.*

In addition, lithium-ion batteries have very thin current collectors which, when combined with the effect of the high thermal and electrical conductivities of the aluminum and copper materials that comprise them, would be easily burned, melted, and/or damaged by the high heat produced by resistance welding. *See, e.g.*, Ex. 2006 at 236-37 (describing exemplary “standard current collector thicknesses of 9 μm for the anode Cu foil and 15 μm for the cathode Al foil” at around the priority date of the '352 Patent). In contrast, resistance welding is known to be a good internal welding method to use on plate type batteries such as nickel-metal-hydride or nickel zinc batteries, as these types of batteries employ much thicker and sturdier electrode plates, and nickel is more thermally resistive due to its high melting point. Ex. 2005 at 2.

Ultrasonic welding, on the other hand, is widely used for the internal welding of thin current collectors in lithium-ion batteries. *Id.* at 3. Ultrasonic welding uses a high frequency of ultrasonic energy to produce oscillating shears to create solid-state bonds between two sheets clamped under pressure. *Id.* The lateral forces generated at high frequency produce an atomic bond between metal interfaces at elevated but relatively low temperatures. *Id.* Ultrasonic welding is a preferred method for internal welding in lithium-ion batteries as it works well for dissimilar materials and multiple thin layers. *Id.* Ultrasonic welding is also preferable for lithium-ion batteries due to

its low operating temperature and good welding performance for aluminum, copper, and other highly conductive materials used in lithium-ion batteries. *Id.*

Another consideration in lithium-ion battery manufacturing is the method of coating an active layer on a current collector of an electrode while creating bare recessed areas. One of the oldest and most widely used coating and recess-creating methods in lithium-ion batteries is “patch” or “gap” coating. In lithium-ion battery “patch” or “gap” coating, the active material layer of an electrode is coated on the current collector of the electrode while leaving certain uncoated “island” areas extending across the entire width of the current collector to create recesses that permit, for example, electrical connections between current collectors and electrode tabs.

Creating recessed areas only in specific areas of the active material of a lithium-ion battery that do not extend across the entire width of the current collector requires a method such as laser ablation, which involves continuously coating an active material layer on a current collector by any conventional coating method, then selectively etching away or removing active material in a select area of the active material layer by irradiating that area with a pulsed laser beam. Because laser ablation relies on pulsed laser beams, laser ablation enables the removal of active material in select areas of the active layer, such as on one side or edge of the electrode. However, because laser ablation employs high temperature pulsed laser

beams to remove active material, it can create defects such as dislocations and burrs in the areas treated with the laser beams. *See, e.g.*, Ex. 1001, 1:27-34.³

B. The '352 Patent

The '352 Patent discloses secondary batteries, such as wound lithium-ion batteries, that solve problems in the prior art caused by burrs generated from grooves created by laser ablation or laser cleaning. Ex. 1001, 2:26-40, 3:50-65, 7:58-8:3, 13:43-50, 14:58-67. In particular, the '352 Patent discloses:

A secondary battery, comprising:
a first electrode tab;
a first electrode plate, comprising:
a first current collector; and
a first active substance, disposed on a first surface of the first current collector and a second surface of the first current collector, wherein the second surface is opposite to the first surface;
a first electrode tab receiving groove, defined by an exposed portion of the first surface of the first current collector and the first active substance on a periphery of the first electrode tab receiving groove, the first electrode tab receiving groove receiving the first electrode tab,

³ The '352 Patent refers to a “laser cleaning” method of creating grooves, which a person of ordinary skill in the art would understand to be referring to laser ablation. Ex. 1001 at 10:64-11:30, Ex. 2001, ¶ 49.

wherein the first electrode tab is electrically connected with the first current collector through the first electrode tab receiving groove;
a first recess that is opposite to the first electrode tab receiving groove, defined by a corresponding portion of the second surface of the first current collector and the first active substance on a periphery of the first recess;
a first electrode plate notch disposed on a side edge of the first electrode tab receiving groove and extending through the second surface and the first surface of the first current collector; and
the first electrode tab receiving groove is formed by the first current collector and at least two first active substance walls;
wherein the secondary battery is a wound-type secondary battery.

Id., Claim 1.

The '352 Patent explains that in prior art batteries:

[T]he laser cleaned groove on the electrode plate has an overheated perforation or a burned hole on the edge due to focal length fluctuation and deviation, such that a plenty of burrs are formed on a current collector on the edge of the groove; if the electrode plate with burrs is directly manufactured into a cell without processing, then the burrs will pierce the separator to cause internal short circuit, a fire disaster and other severe potential safety hazards.

Ex. 1001, 1:27-34.

The '352 Patent then explains that the use of the claimed first electrode plate notch removes the burrs formed by laser ablation thereby preventing an internal short

circuit and thus improving the safety performance of the battery. Ex. 1001, 2:26-40; *see also* 3:50-65, 7:58-8:3, 13:43-50, 14:58-67.

III. LEGAL STANDARDS

The Petition must both “clearly point out the differences between the claimed invention and [the prior art]” and “explain why a person of ordinary skill in the art would have found the claimed subject matter obvious in spite of those differences.” *Synopsys, Inc. v. Mentor Graphics Corp.*, IPR2012-00041, Paper 16 at 14 (P.T.A.B. Feb. 22, 2013). Petitioner must specifically recite where the challenged limitation is found in the secondary reference(s) and explain why a POSITA would have modified the primary reference with the recited limitation from the secondary reference(s). *See Microsoft Corp. v. Secure Web Conf. Corp.*, IPR2014-00745, Paper 12 at 11-13 (P.T.A.B. Sept. 29, 2014). “[M]ere conclusory statements” are not sufficient. *Wowza Media Sys., LLC v. Adobe Sys. Inc.*, IPR2013-00054, Paper 12 at 15 (P.T.A.B. April 8, 2013).

IV. LEVEL OF ORDINARY SKILL IN THE ART

For purposes of this Patent Owner’s Preliminary Response, Patent Owner adopts the definition of a POSITA proposed by Petitioner. *See* Pet. at 14. Patent Owner reserves the right to further address the level of ordinary skill in the art if this proceeding is instituted.

V. CLAIM CONSTRUCTION

For purposes of this Patent Owner's Preliminary Response, Patent Owner applies the plain meaning of any claim terms in view of the '352 Patent's specification. Patent Owner reserves the right to further address claims that may require construction if this proceeding is instituted.

VI. THE BOARD SHOULD NOT INSTITUTE INTER PARTES REVIEW ON THE MERITS

It is Petitioner's burden to demonstrate unpatentability by a preponderance of the evidence. However, Petitioner never identifies a single reference that discloses the claimed first electrode plate notch. Petitioner admits that its primary reference, Wang, does not disclose the first electrode plate notch. Next, Petitioner fails to understand that what it identifies in its secondary reference, Deng, as the alleged first electrode plate notch is not a notch "disposed on a side edge of the first electrode tab receiving groove" that receives a tab, but is a channel for preventing the transferring of heat into the area surrounding the welding area, that does not receive a tab but instead is intentionally created in a direction perpendicular to the tab and welding direction. Finally, Petitioner unilaterally draws a fictional first electrode plate notch into a figure of Zhou without any support for doing so. Modifying a figure to include a claimed feature that was not otherwise described or shown in the reference is insufficient to demonstrate obviousness.

Petitioner’s sparse motivations to combine fare no better. Wang, a lithium-ion battery, does not support Petitioner’s allegations because there is no need to add a first electrode plate notch allegedly taught by Deng or Zhou. Further, Deng discloses a different type of battery and a different welding method as compared to Wang and the ’352 Patent. Indeed, use of Deng’s resistance welding techniques in a lithium-ion battery such as that of Wang would destroy the current collector in Wang’s battery. Finally, Zhou discloses etching an entire current collector length to mitigate burrs from slitting or cutting the electrode but both Zhou’s etching process and the burrs produced from it are unrelated to the burrs that the claimed first electrode plate notch is designed to address. Petitioner thus fails to satisfy its burden. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (quoting 35 U.S.C. § 316(e)) (stating that “the burden of persuasion is on the petitioner to prove ‘unpatentability by a preponderance of the evidence’ . . . and that burden never shifts to the patentee”).

A. Ground 1: Wang and Deng Do Not Render Obvious Claims 1-3 and 9-12

Petitioner fails to establish that there is a reasonable likelihood that at least one challenged claim of Ground 1 is unpatentable, for the reasons below. Ex. 2001, ¶¶ 57-97.

1. The Petition Fails to Show That Wang and Deng Render Obvious Claim 1

a. Deng’s “Notch 2” Is Not “A First Electrode Tab Receiving Groove” or “A First Electrode Plate Notch”

Petitioner acknowledges that Wang does not expressly disclose the claimed first electrode plate notch and relies on Deng as teaching this limitation. Pet. at 28. Petitioner and Petitioner’s expert Dr. von Sacken claim that Deng’s “notch 2” is functionally equivalent to the claimed “first electrode plate notch.” Pet. at 28-30; Ex. 1002, 73-75. Deng’s notch 2, however, is not “disposed on a side edge of the first electrode tab receiving groove” that “*receiv[es] the first electrode tab,*” and thus, discloses neither the “first electrode plate notch” nor “first electrode tab receiving groove” of claim 1. Ex. 1001, Claim 1; Ex. 2001 ¶ 58-68.

Claim 1 recites that the “first electrode tab receiving groove” is “defined by an exposed portion of the first surface of the first current collector and the first active substance on a periphery of the first electrode tab receiving groove” and “the first electrode tab receiving groove receiving the first electrode tab.” Ex. 1001, claim 1. Further, claim 1 requires that “the first electrode tab is electrically connected with the first current collector through the first electrode tab receiving groove.” *Id.* Additionally, claim 1 requires that the claimed first electrode plate notch is “disposed on a side edge of the first electrode tab receiving groove.” *Id.*

Unlike claim 1, which requires that the claimed first electrode plate notch be “disposed on a side edge of the first electrode tab receiving groove,” which “*receiv[es] the first electrode tab*,” Deng explains that *its* notch 2 is positioned in a “to-be-welded area” or the electrode and that the notch 2 is in “a direction *perpendicular to a welding direction*.” Ex. 1005, [0004]⁴; Ex. 2001, ¶ 62. Specifically, Deng recites:

The technical solution provided by the present invention is as follows: before welding, at least one notch is made at a to-be-welded area on the tab or the electrode, the notch being *in a direction perpendicular to a welding direction*; then the electrode and the tab are connected by welding using a conventional welding method so that they are connected to form a whole (the electrode and the tab are welded together into a member called current collector)

Ex. 1005, [0004].

FIG. 1a shows a notch configuration, and FIG. 1b shows an after-welding state. Before welding, a notch 2 is made at a to-be-welded area on an electrode 3, the notch being *in a direction perpendicular to a welding direction (the direction is indicated by the dotted line in the drawing)*; then a tab 1 and the electrode 3 are welded to form a current collector 4.

⁴ All emphasis in this Preliminary Response is added.

Id. [0014].

Below are Deng's Figure 1a showing Deng's electrode 3 before welding, and Figure 1b showing Deng's electrode 3 after welding. Ex. 1005, Figs. 1a-1b, [0014]. As can be seen from Figure 1b (and accepting *arguendo* Petitioner's interpretation that Figures 1a and 1b of Deng illustrate a **top** view (Pet. at 29-31)), the tab 1 of Deng is, at best, being welded to an area *on the top of* and *overlapping* with the electrode 3 and is not "received" in notch 2, or any groove where the notch 2 is disposed, as required by claim 1. Ex. 2001, ¶ 63.

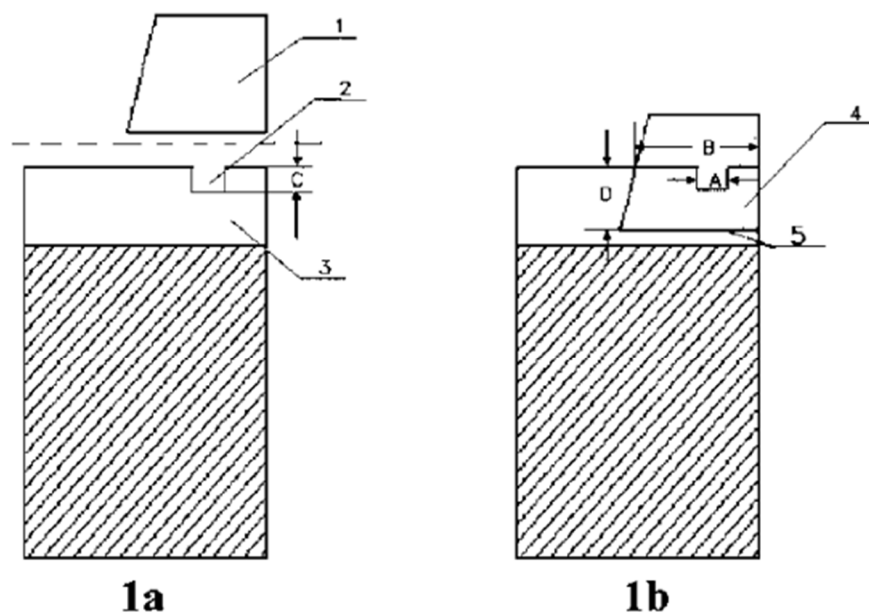


FIG. 1

Ex. 1005, Figs. 1a-1b.

Petitioner expressly acknowledges that Deng's notch 2 is in a "to-be-welded area" of the electrode before the tab is welded to the electrode" but is silent as to

whether the notch 2—or any groove where the notch 2 is disposed as required in claim 1—actually receives a tab. Ex. 2001, ¶ 65. As Petitioner notes:

As discussed above in Section VII.A.2, Deng discloses making a notch through the edge of an electrode plate in a “to-be-welded area” of the electrode before the tab is welded to the electrode. Ex. 1005, ¶¶[0004], [0014]. Deng discloses doing so because welding the electrode tab to the electrode “results in deformation caused by heat and stress accumulation,” which “will lead to serious warping of the tab or wrinkling of the welding area of the electrode, and such deformation is detrimental to electrical performance of the battery.” Id., ¶[0002]. Deng’s notch “changes the structure of a welding area of the tab” on the electrode so that “the welding area is discontinuous, and heat or deformation is also discontinuous and stops at the notch rather than accumulates into the next section. As a result, accumulation of heat in the welding is reduced, and accumulation of warping is also reduced.” Id., ¶[0007]. This “enables reduction of warping of the current collector to a very large extent, demonstrates good results, and improves outcome of battery cell assembly, thereby enhancing electrical performance of batteries.” Id.; Ex. 1002, ¶73.

Pet. at 28-29.

Moreover, Deng discloses that a plurality of notches is preferred. Ex. 1005, [0006]. A POSITA would have understood that a tab could not be *received* by a plurality of notches. Ex. 2001, ¶ 66. Instead, a POSITA would have understood that Deng merely discloses the use of notches in a perpendicular direction to prevent the

spreading and accumulation of heat into the area surrounding the welding area, not to receive a tab. *Id.* ¶¶ 66, 83. As a result, notch 2 of Deng cannot be a “first electrode plate notch” that is “disposed on a side edge of the first electrode tab receiving groove” that “receiv[es] the first electrode tab.” Ex. 1001, Claim 1; Ex. 2001, ¶ 67. Because Deng does not disclose a “first electrode tab receiving groove” that “receiv[es] the first electrode tab,” it cannot and does not disclose “first electrode plate notch” that is “disposed on a side edge of” such a groove. Ex. 1001, Claim 1; Ex. 2001, ¶ 68.

b. A POSITA Would Not Have Combined Wang and Deng

Petitioner explains that Deng’s notch 2 is provided to reduce deformation and warping caused by heat and stress accumulation from the process of resistance welding Deng’s electrode tab to Deng’s electrode. Pet. at 28-29. Petitioner then asserts that a POSITA would have been motivated to modify Wang’s electrode with Deng’s notch in view of the benefits provided by Deng’s notch, such as reduction of heat accumulation and the resulting deformation and/or warping of the electrode to which the tab is welded:

In view of Deng’s stated benefits of its electrode notch, such as to reduce the accumulation of heat and the resulting deformation and/or warping of the electrode to which the tab is welded, a POSITA would have been motivated to modify Wang’s negative electrode to include a

notch on the current collector where the first (e.g., anode) electrode tab will be welded. Ex. 1002, ¶76.

Id. at 30.

Contrary to Petitioner’s assertions and as explained further below, a POSITA would not have been motivated to combine Wang’s battery with Deng’s notch 2 to arrive at the claimed secondary battery. Ex. 2001, ¶¶ 69-96. At best, Wang discloses a lithium-ion battery that employs very thin, foil type aluminum or copper current collectors and thin electrode tabs (Ex. 1004, [0018]), whereas Deng discloses an unrelated *flat metal plate type battery* such as a nickel metal hydride, lead acid, or nickel zinc battery, that comprises thick electrode plates and large, thick electrode tabs, as explained below. *Id.*, ¶¶ 71, 76-81. A POSITA would not have considered a flat metal plate type battery’s technology when innovating with respect to a lithium-ion battery. *Id.*

Next, Deng discloses the use of *resistance welding* for the purposes of welding a tab to a “to-be-welded area.” Ex. 1004, [0002], [0014]; Ex. 2001, ¶¶ 72, 82-88. Specifically, Petitioner relies on Deng’s method of reducing the accumulation of heat and deformation and/or warping of the electrode resulting *from resistance welding* as its reason to combine Wang and Deng. Pet. at 30; Ex. 2001, ¶¶ 69-70.

Wang, on the other hand, uses ultrasonic welding. In particular, Wang discloses that its cells, and tabs of the same electrode type, are welded by “ultrasound

welding” which a POSITA would have understood to be referring to ultrasonic welding. Ex. 1004, [0043], [0048], [0109]; Ex. 2001, ¶ 73. A POSITA would have further understood that Wang’s electrode tabs are also internally welded by ultrasonic welding, as this was, at the time of the priority date of the ’352 Patent, and continues to be now, the industry standard for internal welding in lithium-ion batteries, due to the thin copper and aluminum current collectors used in lithium-ion batteries. Ex. 2001, ¶ 73; *see supra* § II.A.

A POSITA would have understood that the ultrasonic welding method used by Wang would have ***no need for reducing heat accumulation***, unlike the resistance welding used by Deng. Ex. 2001, ¶ 74. A POSITA would not have used the resistance welding method disclosed in Deng in Wang’s lithium-ion battery, and, thus, would not have used or relied on any methods of reducing problems from resistance welding such as heat accumulation and deformation and/or warping, when modifying Wang’s lithium-ion battery. *Id.* In fact and discussed *supra* § II.A and below, use of resistance welding in Wang would cause significant damage to Wang’s current collector, rendering Wang’s lithium-ion battery inoperable. *Id.*

For at least these reasons, a POSITA would not have combined Wang and Deng as proposed by Petitioner.

(i) **Deng Is Not a Lithium-Ion Battery**

A POSITA would not have been motivated to combine Deng with Wang at least because Deng is not analogous art. “Two separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor’s endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Bigio*, 381 F.3d 1320, 1325, (Fed. Cir. 2004) (citing *In re GPAC Inc.*, 57 F.3d 1573, 1578 (Fed. Cir. 1995)).

First, Deng is a *flat metal plate type battery* and both the ’352 Patent and Wang are lithium-ion batteries. Ex. 2001, ¶ 76. Specifically, Deng’s figures and disclosure indicate that Deng discloses a flat metal plate type battery such as a nickel metal hydride, lead acid, or nickel zinc battery, that employs thick electrode plates and large, thick electrode tabs, which is completely different from lithium-ion batteries, which employ very thin, foil type aluminum or copper current collectors and thin electrode tabs. *Id.* A POSITA would not consider flat metal plate type batteries when designing a lithium-ion battery and would consider Deng to be from a different field of endeavor. *Bigio*, 381 F.3d at 1325-26.

Deng discloses welding a large, and likely thick electrode tab (as needed for use with resistance welding) to its electrode to “form a current collector 4” as shown in reproduced Figures 1a and 1b of Deng below:

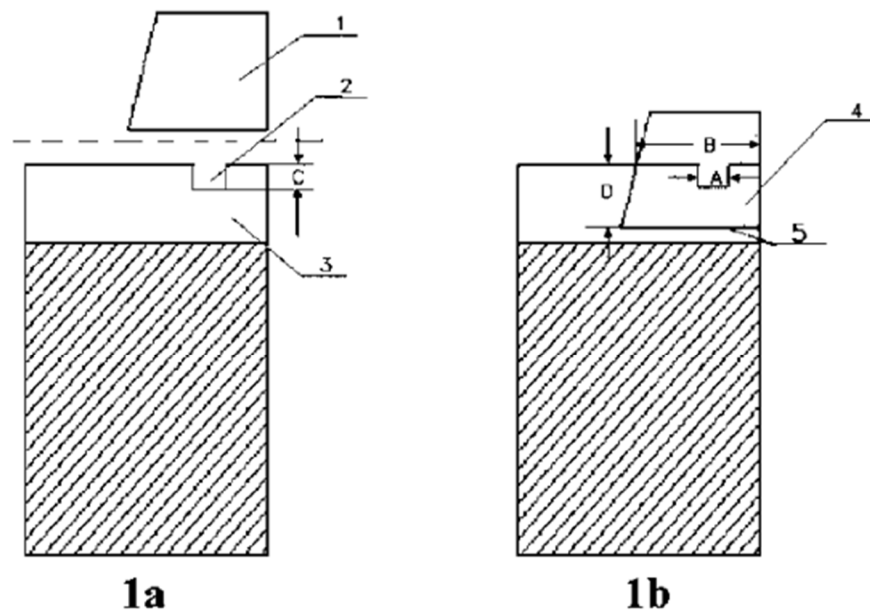


FIG. 1

Ex. 1005, Figs. 1a and 1b; Ex. 2001, ¶ 77.

The relative sizes and dimensions of Deng's electrode 3 and electrode tab 1 indicate that Deng's battery is not a lithium-ion battery, but a flat metal plate type battery that employs thick metal electrode plates and thick electrode tabs, such as a nickel metal hydride battery.⁵ Ex. 2001, ¶ 78. In addition, Deng's manner of welding a large electrode tab to an electrode in a direction perpendicular to the tab and

⁵ The assignee of Deng, Hunan Keba Automobile Power Battery Limited Liability Company, is a company that is involved in the design and production of nickel metal hydride batteries. *See* Ex. 2009; Ex. 2001 ¶ 80.

welding direction (Ex. 1001, Figs. 1a and 1b, [0004]) also indicates that Deng's battery is a flat metal plate type battery, as a POSITA would not weld electrode tabs in lithium-ion batteries in such a manner. *Id.* Furthermore, Deng's Figures 1a and 1b illustrate that Deng creates a relatively large notch 2, which a POSITA would not do in a lithium-ion battery because such large notches would weaken the fragile thin current collectors of a lithium-ion battery, which could then easily tear during subsequent manufacturing steps, substantially reducing production yields. *Id.* Furthermore, a person of ordinary skill in the art would not use such large, thick electrode tabs in lithium-ion cells because they will reduce the energy density (Whr/kg) of the cell, reducing performance and making it less competitive.

A POSITA would further understand that Deng discloses a metal plate type battery and not a lithium-ion battery because of Deng's reliance on resistance welding to internally weld its electrode tab to its electrode. Ex. 1001, [0002]; Ex. 2001, ¶ 79. As discussed in further detail below, resistance welding is not an internal welding method that a POSITA would use in lithium-ion batteries. *Id.* Instead, resistance welding would only be used for internal welding in a flat metal plate type battery such as a nickel metal hydride battery. *Id.*

As such, a POSITA would not have considered, let alone be motivated, to combine Wang, which relates to a lithium-ion battery, with Deng, which relates to a flat metal plate type battery. *Id.*, ¶ 81.

(ii) **Deng's Heat Mitigation Technique is not Reasonably Pertinent to Lithium-Ion Batteries**

Deng's solution is likewise not reasonably pertinent to the particular problem with which the inventor of the '352 Patent is involved. *In re Klein*, 647 F.3d 1343, 1350–51 (Fed. Cir. 2011). Specifically, the '352 Patent discloses:

In the prior art, the purpose of improving energy density is achieved by configuring a groove on an electrode plate and welding an electrode tab in the groove. However, the process is realized by independent laser cleaning device and welding-winding device respectively at the present stage. The comprehensive cost of the devices is high, and the factory buildings occupy large space, with the result the manufacturing cost of the entire lithium battery is high. Furthermore, the laser cleaned groove on the electrode plate has an overheated perforation or a burned hole on the edge due to focal length fluctuation and deviation, such that a plenty of burrs are formed on a current collector on the edge of the groove; if the electrode plate with burrs is directly manufactured into a cell without processing, then the burrs will pierce the separator to cause internal short circuit, a fire disaster and other severe potential safety hazards. In the prior art, a thick adhesive tape is stuck in the groove to prevent the burrs from piercing the separator. However, sticking an adhesive tape in the groove will certainly increase the thickness of the cell, thus causing loss to energy density.

Ex. 1001, 1:19-39.

In contrast to the '352 Patent, Deng discloses, at best, heat mitigation techniques related to resistance welding. Ex. 1005, [0002]. As described herein, a POSITA would not use resistance welding for internal welding in a lithium-ion battery. *See supra* § II.A; Ex. 2001, ¶¶ 82-88. Moreover, resistance welding would damage the current collector of a lithium-ion battery. Ex. 2001, ¶ 88. As a result, a flat metal plate type battery that relies on resistance welding as taught by Deng would not have been considered by the inventors when solving the problems of the '352 Patent. *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1379–80 (Fed. Cir. 2007) (quoting *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992)).

Specifically, Deng explains that welding between an electrode tab and an electrode is typically done by “electric resistance welding” which produces heat and stress accumulation that causes deformation and warping of the tab or wrinkling of the welding area of the electrode:

Among components in a battery, current collector connection comprises connection between a tab and a center pin and connection between a tab and an electrode; the former typically uses riveting, welding, or a combination of both, and the latter typically uses *electric resistance welding*. Currently, the whole welding area is continuous in the welding of the tab and the electrode. In the welding process, *the accumulation of heat and stress cannot be eliminated*. Therefore, *this welding method easily results in deformation caused by heat and stress accumulation. The accumulation of the deformation will lead*

to serious warping of the tab or wrinkling of the welding area of the electrode, and such deformation is detrimental to electrical performance of the battery.

Ex. 1005, [0002].

Deng then explains that its notch is made at the welding area of the tab or electrode to reduce the accumulation of heat and warping, indicating that its battery also uses resistance welding, and that its notch is created to address the heat and warping problems that result from resistance welding. Ex. 1005, [0007]; Ex. 2001, ¶ 83. Specifically, Deng discloses creating a notch to change the structure of the welding area such that the welding area will be discontinuous and heat will not spread and accumulate into the area surrounding the welding area, to address the heat and warping caused by resistance welding. Ex. 1005, [0007].

Because a flat metal plate type battery, such as the battery disclosed in Deng, has thick electrodes and thick electrode tabs, it requires a high energy, high heat-based welding technique such as resistance welding that can provide sufficiently high currents to weld the thick electrode plates and electrode tabs in such batteries. Ex. 2001, ¶ 84. The high current from resistance welding in turn generates heat and stress, which accumulate in the welded area, and cause warping of the electrode tab or wrinkling of the welding area of the electrode. *Id.*; *see, e.g.*, Ex. 1005, [0002]. Deng provides its notch 2 so that “the welding area is discontinuous, and heat or

deformation is also discontinuous and stops at the notch rather than accumulate[] into the next section” and as a result, “accumulation of heat in the welding [area] is reduced, and accumulation of warping is also reduced.” Ex. 1005, [0007].

On the other hand, lithium-ion batteries, such as the batteries described in Wang and the '352 Patent, employ ultrasonic welding for internal welding, which is a different and unrelated form of welding. Ex. 2001, ¶ 85. Ultrasonic welding involves the use of a high frequency of ultrasonic energy to produce oscillating shears to create solid-state bonds between two sheets clamped under pressure and at elevated but relatively low temperatures. Ex. 2001, ¶ 85; Ex. 2005 at 3. Ultrasonic welding can be used to join a wide range of types of metal sheets or thin foils and is thus a suitable method for welding electrode tabs to current collectors in lithium-ion batteries due to its low operating temperature and good welding performance for the thin aluminum and copper current collectors used in lithium-ion batteries, as well as other highly conductive materials. Ex. 2001, ¶ 85; Ex. 2005 at 3.

Deng’s purported benefit of reducing heat accumulation and warping caused by the high heat from resistance welding Deng’s electrode tab to Deng’s electrode is not an issue for the lithium-ion battery of Wang or the '352 Patent, which a POSITA would understand not to use resistance welding, but rather, ultrasonic welding (*see* Ex. 1004, [0043], [0048], [0109]), a technology that does not produce the substantial heat and warping produced by the resistance welding method

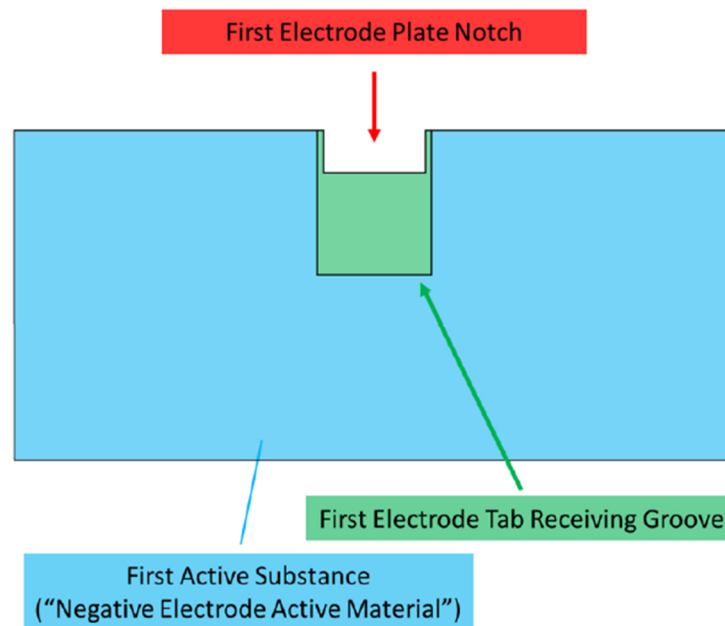
described in Deng. Ex. 1005, [1002], [0007]; Ex. 2001, ¶ 87. As a result and in addition to the fact that resistance welding would not be considered at all, there would have been no reason for a POSITA to consider heat dissipation and warping from resistance welding when internally welding electrode tabs to current collectors in lithium-ion batteries such as that of Wang because these are not problems found in lithium-ion batteries that rely on ultrasonic welding for internally welding electrode tabs to current collectors. Ex. 2001, ¶ 87.

Further and as described *supra* § II.A, resistance welding relies on the electrical resistance at the metal interface produced by a high electrical current to cause a localized heating and fusion of materials. As a result, resistance welding would burn, melt, and/or damage Wang’s thin current collector rendering Wang’s lithium-ion battery inoperable. Ex. 2001, ¶ 88. The damage that would likely be caused by resistance welding further demonstrates that the reference would not have been considered by a POSITA in improving or modifying Wang. *Id.*

c. Petitioner’s Proposed Modification Would Render Wang’s Current Collector Susceptible to Damage and Tearing

Petitioner alleges that a POSITA would modify Wang with Deng’s notch to create the following unsupported visualization of Wang’s modified notch from a top-down view, including an unsupported “First Electrode Tab Receiving Groove” and

an unsupported and comparatively deep “First Electrode Plate Notch” drawn in by Petitioner. Pet. at 31; Ex. 2001, ¶ 89.



Pet. at 31.

As explained *supra* § II.A, lithium-ion batteries employ thin current collectors. *See, e.g.*, Ex. 2006 at 236-37 (describing exemplary “standard current collector thicknesses of 9 μm for the anode Cu foil and 15 μm for the cathode Al foil” at the time of the priority date of the ’352 Patent). The unsupported notch in Petitioner’s proposed combination of Wang and Deng appears comparatively deep, is not a structure that is normally made in lithium-ion batteries, and fails to appreciate the very thin and fragile nature of current collectors in lithium-ion batteries, such as that of Wang. Ex. 2001, ¶ 90. This deep notch could also cause inconsistent weld performance when using ultrasound for welding. *Id.* at ¶ 75.

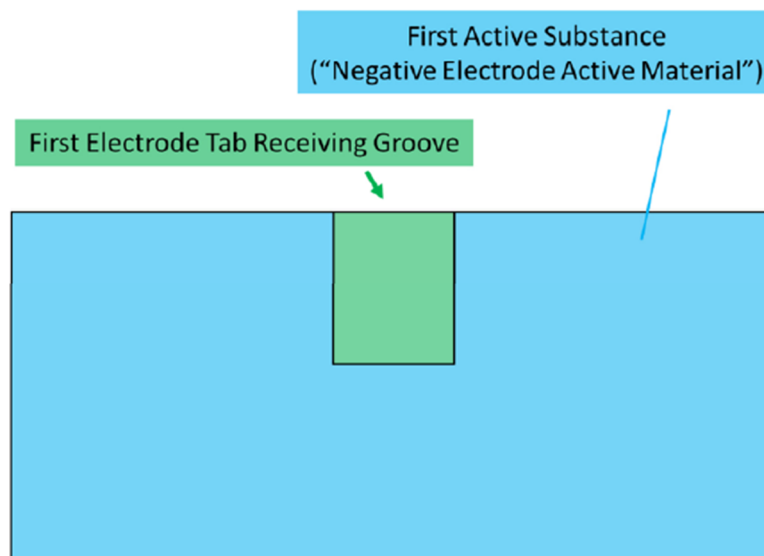
In fact, a POSITA would understand that Petitioner's proposed notch in Wang is so deep that it would weaken the fragile, thin current collector of Wang and render it susceptible to damage and tearing during subsequent manufacturing steps. *Id.*, ¶ 91. A POSITA would understand that such susceptibility to damage and tearing would substantially reduce production yields. *Id.* As such, a POSITA reading Wang's lithium-ion battery and Deng's flat metal plate type battery would not be motivated to modify Wang with Deng to create such a deep notch. *Id.*

d. Even if Wang and Deng Were Combined as Proposed by Petitioner, the Resulting Notch Would Not Disclose the Claimed First Electrode Plate Notch

Even assuming that a POSITA would be motivated to modify Wang with Deng's notch as proposed by Petitioner (which a POSITA would not be motivated to do, as explained above), the resulting notch would not be the claimed "first electrode plate notch" because it would not be "disposed on a side edge of the first electrode tab receiving groove" that is "defined by an exposed portion of the first surface of the first current collector and the first active substance on a periphery of the first electrode tab receiving groove," as required by claim 1. Ex. 1001, Claim 1; Ex. 2001, ¶ 92.

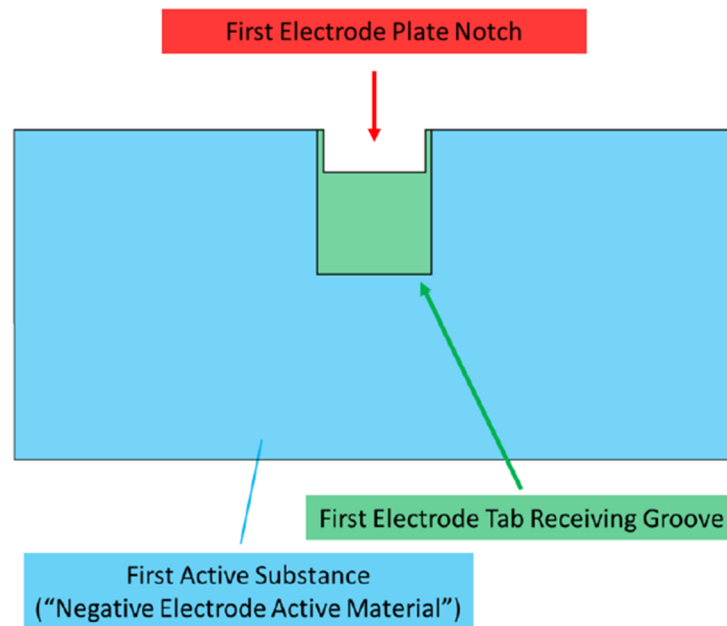
First, Petitioner's unsupported first electrode tab receiving groove illustrated in Petitioner's unsupported top-down view of Wang's electrode below is an incorrect projection of Wang because Wang employs *patch coating* to create "island areas"

such as its electrode tab receiving groove, which requires an area or strip *across the entire width of the electrode* to be uncoated. *See supra* § II.A; Ex. 1004, [0007], [0047]-[0049]; Ex. 2001, ¶ 93. Yet in the figure below, Petitioner shows active material removed from only one side, or edge, of the electrode, which a POSITA would understand is not possible with the patch coating method used in Wang. *Id.*



Pet. at 23.

Petitioner further compounds its erroneous, unsupported visualization of Wang's top-down view, by asserting that modifying Wang's electrode with Deng's notch would result in the unsupported first electrode plate notch drawn in by Petitioner in the figure below. Ex. 2001, ¶ 94.



Pet. at 31.

Petitioner does not provide any basis for why Deng's notch, when combined with Wang's electrode, would look as illustrated in the figure above, only providing the conclusory statement that "[b]ased on Wang's disclosure, a POSITA would have understood that the notch in the modified Wang negative electrode would appear in a top-down view as shown in the figure [above]. Ex. 1002, ¶ 77." Pet. at 31; Ex. 2001, ¶ 95. Instead, as admitted by Petitioner, Wang discloses that a negative electrode tab is received by and is parallel to the alleged first tab receiving groove (Pet. at 23-24), whereas Deng discloses that its notch is "perpendicular to a welding direction." Ex. 1005, [0004]; Ex. 2001, ¶ 95. As such, if notch 2 of Deng were to be added to Wang, it would not be in the direction suggested by Petitioner but,

according to Deng, would be in the direction perpendicular to the alleged first tab receiving groove and the first electrode tab. Ex. 2001, ¶ 95.

For the above reasons, not only does Petitioner's unsupported notch in its proposed combination of Wang and Deng lack any support or basis, but even assuming that such a notch were to be made as proposed by Petitioner, it would not read on the claimed first electrode plate notch, and thus Petitioner's proposed combination of Wang and Deng fails. *Id.* at ¶ 96.

2. Claims 2-3 and 5-12 Are Not Unpatentable

Claims 2-3 and 5-12 are not unpatentable for the same reasons as discussed above with respect to claim 1 and at least because they depend from claim 1. Ex. 2001, ¶ 97. Patent Owner reserves the right to address claims 2-3 and 5-12 individually if this proceeding is instituted.

B. Ground 2: Wang and Zhou Do Not Render Obvious Claims 1-3 and 9-12

Petitioner fails to establish that there is a reasonable likelihood that at least one challenged claim of Ground 2 is unpatentable, for the reasons below. Ex. 2001, ¶¶ 98-149.

1. Petitioner Fails to Show That Wang and Zhou Render Obvious Claim 1

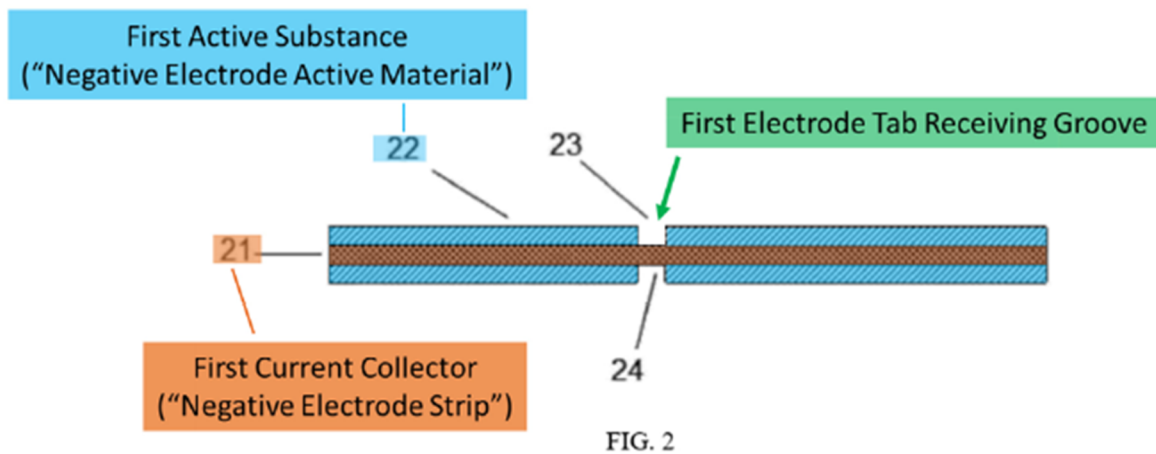
Petitioner's positions with respect to Ground 2 are as deficient as those of Ground 1. Ex. 2001, ¶¶ 99-100. First, Wang relies on patch coating as its technique

to coat its current collector with active material. Ex. 2001, ¶¶ 101-11. But a POSITA would understand that patch coating does not result in burrs, certainly not burrs that would be addressed by the claimed notch, or by Zhou. *Id.* Next, Zhou discloses etching the *entirety* of the length of a current collector such that the length of current collector is indented as compared to the Zhou active material. *Id.*, ¶¶ 100, 118-24. This indented current collector is essential to Zhou’s intended purpose of reducing the likelihood of damage to the separator and Zhou instructs that the integrity of the positive electrode film 20 coating is not to be affected. *Id.* That said, etching along the entire length of Zhou would create a different structure separate and distinct from the ’352 Patent’s claimed notch or groove. *Id.* ¶¶ 100, 125-30. Finally, even if a notch were formed as proposed by Petitioner, the resulting structure could never be the claimed notch which is “disposed on a side edge of the first electrode tab receiving groove,” which is in turn “defined by an exposed portion of the *first surface of the first current collector* and the first active substance on a periphery of the first electrode tab receiving groove.” Ex. 1001, Claim 1; Ex. 2001, ¶¶ 100, 141-48. For at least these reasons, Petitioner’s Ground 2 fails.

**a. Wang Creates Its Grooves By Patch Coating,
Obviating the Need for the Claimed First Electrode
Plate Notch**

Petitioner and Dr. von Sacken assert that an uncoated area of Wang’s negative electrode strip 21 is the claimed “first electrode tab receiving groove.” Pet. at 20-23,

61; Ex. 1002, 62-66; Ex. 2001, ¶ 101. Reproduced below is Petitioner’s annotated Fig. 2 of Wang illustrating the uncoated area of Wang that Petitioner alleges is the claimed first electrode tab receiving groove. Ex. 2001, ¶ 102.



Pet. at 21, 61.

As described *supra* § II.A, the coating method from Wang that Petitioner refers to is an old and widely used coating method in the lithium-ion battery industry known as “patch” or “gap” coating.⁶ Ex. 2001, ¶ 103. Wang’s alleged invention employs this “patch” or “gap” coating method to produce uncoated “island areas” in

⁶ In lithium-ion cell “patch” or “gap” coating, the active material of an electrode is coated on the current collector of the electrode by leaving certain uncoated. “island” areas extending across the entire width of the current collector to provide access to electrical connections, such as electrical connections to electrode tabs. *See supra* § II.A.

certain locations of the positive and negative electrode strips, including for an electrode tab receiving groove, to prevent lithium plating resulting from a positive electrode active material facing the negative electrode tab when the electrodes are wound. Ex. 1004, [0007], [0047]-[0049]. Wang specifically refers to the “island areas” and makes clear that these areas “prevent[] lithium plating caused by a positive electrode active material facing the negative electrode tab”:

[I]n the present invention, island area is a widely known term in the art and refers to an uncoated foil area that is not coated with any positive electrode active material on a positive electrode strip facing the front and back surfaces of a weld area of a negative electrode tab once a cell is wound.

...

The present invention provides the following benefits:

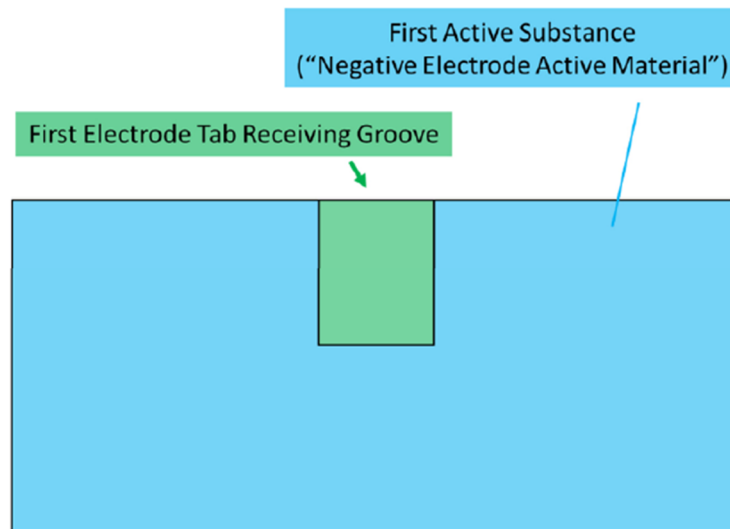
...

In the present invention, a positive electrode first island area and a positive electrode second island area that are not coated with any active materials are disposed at certain distances on two sides from the positive electrode tab of the lithium-ion battery; when wound, the positive electrode second island area and the positive electrode first island area correspond to and cover the negative electrode tab and its back side, respectively, thereby preventing lithium plating caused by a positive electrode active material facing the negative electrode tab.

Id., [0007], [0047]-[0049].

A POSITA would understand that creating an uncoated area in the active material of a lithium-ion battery by patch coating requires the entire width of an area of a current collector or electrode to be uncoated so as to form an uncoated “island” or “strip.” Ex. 2001, ¶ 104. While Wang doesn’t show a top-down view of its electrode, a POSITA would have understood that Wang’s uncoated islands, including Wang’s tab receiving groove, would run the entire width of Wang’s current collector or electrode so as to form strips of uncoated recessed areas. *Id.*

While Petitioner acknowledges that “Wang does not provide a top-down perspective view of its negative electrode” and attempts to create its own, Petitioner fails to appreciate that Wang’s uncoated islands, including Wang’s disclosed tab receiving groove, would run the *entire width* of Wang’s electrode. Pet. at 22; Ex. 2001, ¶ 105. Instead, Petitioner erroneously shows a top-down view of Wang’s electrode where an unsupported electrode tab receiving groove is present only on one side, or edge, of the electrode. Pet. at 22-23; Ex. 2001, ¶ 105. These figures *have no support*, are at odds with the disclosure of Wang, and should be rejected. Ex. 2001, ¶ 105.



Pet. at 23.

Indeed, a POSITA would understand that it would not be possible to form an uncoated tab receiving groove using patch coating in just one side of Wang's electrode as illustrated in Petitioner's unsupported figure above because Wang's patch coating process requires an uncoated patch or island area to run across the *entire width* of the electrode, and not just on a select portion of the electrode as shown in Petitioner's figure above. Ex. 2001, ¶ 106. Regardless, Wang's electrode tab receiving groove, which is created by "patch" or "gap" coating certain areas of its electrode strip with active material and leaving other "island areas" uncoated,

does not produce the types of burrs that the combination of Wang with Zhou allegedly solves.⁷ Pet. at 68-69; *see also* Ex. 2001, ¶ 110.

In view of the patch coating method disclosed by Wang, a POSITA would understand that there would be no burrs to remove from Wang's patch coated electrodes in the location alleged by Petitioner and, thus, even if it were possible to create a notch in Wang in the way described by Petitioner, a POSITA would have no reason or motivation to create the claimed first electrode plate notch in Wang's battery. Ex. 2001, ¶ 111.

⁷ In contrast to the "patch" or "gap" coating of Wang, Petitioner states that the '352 Patent discloses a notch that "can remove the burrs formed on the current collector 1011 of the edge part of the anode electrode tab receiving groove 1013 during formation," thus "effectively preventing the secondary battery 1 from generating internal short circuit, and in turn improving the safety performance of the secondary battery 1 while ensuring a high energy density." Pet., 12 (citing Ex. 1001, 3:50-65, Fig. 5(a); Ex. 1002, ¶32) *see also* Ex. 2001, ¶ 107. The '352 Patent discloses the use of a notch to remove the burrs on the current collector at the edge of the electrode tab receiving groove to prevent an internal short circuit and improve the safety performance of the battery. Ex. 1001, 2:26-40; *see also* 1:27-34, 3:50-65, 7:58-8:3, 13:43-50, 14:58-67.

b. A POSITA Would Not Have Combined Wang and Zhou

Petitioner asserts that “Zhou discloses a method of removing electrode burrs at the edge of an electrode current collector using gas plasma etching.” Pet. at 61 (citing Ex. 1013, ¶¶[0008], [00015], Ex. 1002, ¶140); Ex. 2001, ¶ 112. Petitioner acknowledges that the process disclosed by Zhou etches a current collector along the entire length of the electrode or current collector. *Id.* at 58-69 (citing Ex. 1013, ¶¶[0001], [0007], [0008], [0015]); Ex. 2001, ¶ 112. Petitioner confirms this interpretation through its annotated figures, and by noting that the result of etching across the entire length of Zhou’s electrode is an “indented” current collector in which the current collector has a narrower width than Zhou’s electrode coating. Pet. at 59-62, 67; Ex. 2001, ¶ 112.

In view of the admission that Zhou is a process that etches a current collector along the entire length of the electrode and the confirmation by Dr. von Sacken that “Zhou does not show the electrode tab receiving groove” (Ex. 1002, ¶141), it is nonsensical that Petitioner then erroneously assumes that “a POSITA would have understood that Zhou’s electrode tab receiving groove would appear in a top down view, for example, as shown in annotated Figure 2 below.” Pet. at 62–63 (illustrating the fictional Figure 2); Ex. 2001, ¶ 113, 116-130. Next, and based entirely on its own erroneous assumption, Petitioner asserts that this groove, which is not shown in or

described in Zhou, would further “include[] an electrode plate notch disposed on a side edge of the electrode tab receiving groove in the same manner that the ’352 patent’s ‘anode electrode plate die-cut notch 1014’ is disposed on a ‘side edge’ of an ‘anode electrode tab receiving groove 1013’” and that “Zhou’s notch extends entirely through the current collector (e.g., in a top-to-bottom direction in Figure 3), and thus extends through the current collector’s first and second surfaces.” Pet. at 63-64; Ex. 2001, ¶ 113, 116-130. Petitioner and its expert cannot support these naked and conclusory assertions, which contradict Zhou’s actual disclosure. Ex. 2001, ¶ 113, 116-130.

Petitioner finally asserts that Zhou’s rationale of removing burrs by plasma etching the current collector is identical to the rationale of removing burrs that the ’352 Patent provides for its notch. *Id.* Petitioner is simply wrong. The burrs formed in Zhou are a result of slitting or cutting the electrode along the entire length of the electrode during bulk processing and are entirely distinct from the burrs addressed by the ’352 Patent’s first electrode plate notch, which are caused by laser ablation in a localized area of the active substance where the first electrode tab receiving groove is formed. Ex. 2001, ¶ 115, 131-36. As such, Petitioner’s sole rationale for the combination fails. Ex. 2001, ¶ 115, 131-36.

(i) **Zhou Does Not Disclose a First Electrode Tab Receiving Groove or First Electrode Plate Notch**

As noted above, Petitioner asserts that:

Zhou describes etching the current collector, and thus creating the electrode plate notch, at an exposed area of the current collector where an electrode tab will later be welded to the current collector (the claimed “electrode tab receiving groove”). Ex. 1013, ¶[0025] (cautioning against making the current collector etch depth “too great,” which “will cause unnecessary damage to an area on the positive electrode current collector 10 that is not covered by a positive electrode active material, thereby affecting tab welding in a subsequent step.”); Ex. 1002, ¶141.

Pet. at 62-63.

Petitioner then, without any support, asserts, as shown below, that an undisclosed groove would “appear” in a top-down view of Zhou and creates a new and unsupported figure with an unsupported Electrode Tab Receiving Grove that is in direct conflict with what is disclosed in Zhou and shown in Zhou’s figures. Ex. 2001, ¶ 117.

Zhou does not show the electrode tab receiving groove (e.g., the “area on the positive electrode current collector 10 that is not covered by a positive electrode active material”) in its figures, but based on Zhou’s disclosure, a POSITA would have understood that Zhou’s electrode tab receiving groove would appear in a top-down view, for example, as

shown in annotated Figure 2 below. Ex. 1013, ¶[0025], Fig. 2; Ex. 1002, ¶141.

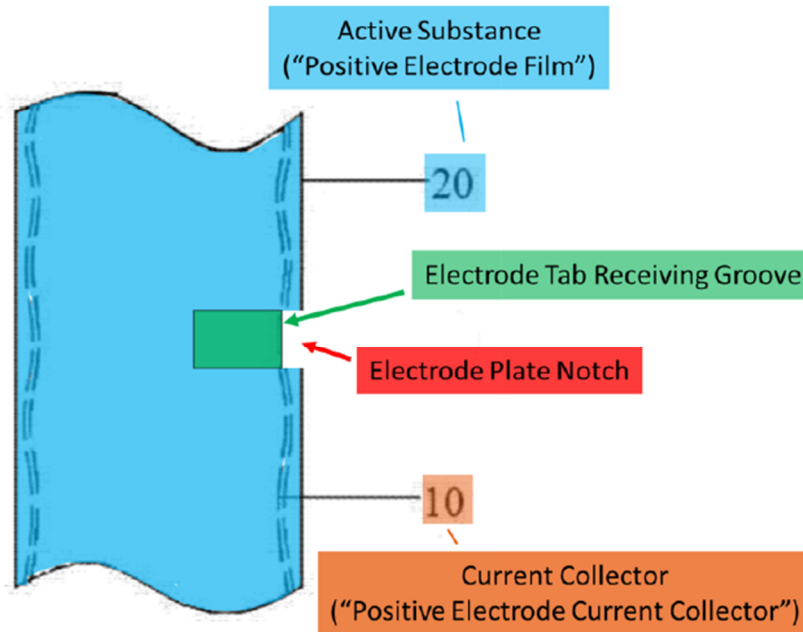


FIG. 2

Pet. At 63.

In contrast to the above figure created by Petitioner, Zhou discloses a continuously coated electrode that does not have an uncovered region *at all*, which means that the entirety of the current collector is covered by active material (see Petitioner's blue annotations below). Ex. 1013, Fig. 2; Ex. 2001, ¶ 118.

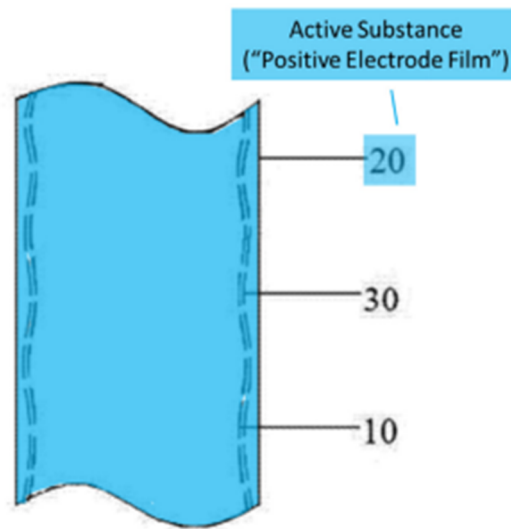
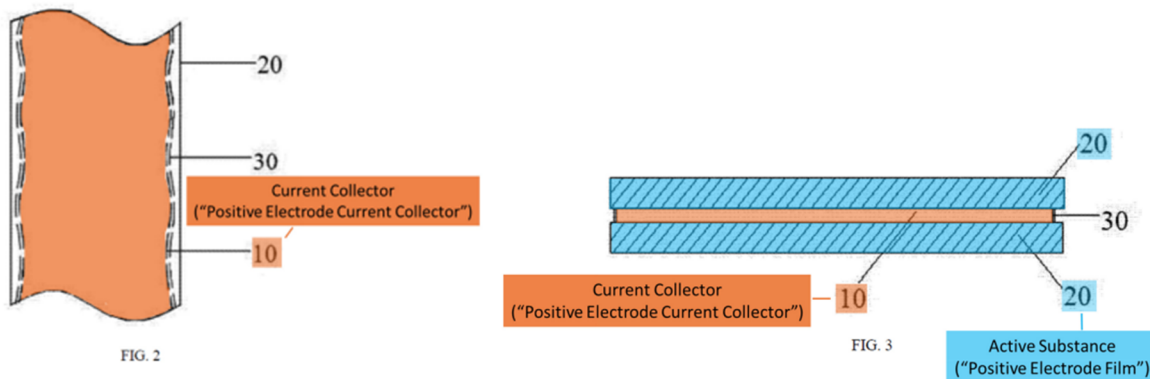


FIG. 2

Pet. at 62.

Further, Zhou does not create an electrode tab receiving groove or electrode plate notch at all but instead etches the current collector 10 along the entire length of its electrode so that the entirety of the current collector 10 is indented as compared to the positive electrode film 20 (see Petitioner's orange annotations below). Ex. 1013, Fig. 2; Ex. 2001, ¶ 118. Petitioner confirms this. Pet. at 61 ("etching results in a current collector with an 'indented' structure having a width that is less than the width of the electrode film (i.e., active substance) on the surfaces of the current collector.")



Pet. at 62.

In addition to the figures provided by Petitioner demonstrating that there is no groove or notch in Zhou, Zhou's specification makes clear that integrity of the positive electrode film coating cannot be affected. Indeed, Zhou discloses that the entire length of the current collector would have been etched "*without affecting the shape of the edge of the positive electrode or the integrity of the positive electrode film 20 coating,*" further undercutting Petitioner's alleged modification that would certainly impact the shape of the edge of the electrode. Ex. 1013, ¶[0037]; Ex. 2001, ¶ 118.

Regardless, Zhou discloses that burrs form from "electrode cutting," and the aluminum foil serving as the current collector will "have edges that are level with or slightly protrude over edges of a positive electrode film 240 and have some burrs that resulted from cutting." Ex. 1013, [0004]. Zhou is using the term "electrode cutting" for what is commonly known in the industry as "slitting." Ex. 2001, ¶ 119.

Slitting uses knife edge wheels to slit wide electrode reels from a coater to the width required for the cells being manufactured. *Id.* In order to address its particular burrs caused by splitting, Zhou offers a specific mitigation strategy whereby Zhou etches the entire electrode 2 along the entire length of the current collector 10 by gas plasma etching using gases that selectively etch only the current collector 10 and not Zhou's active substance ("electrode film 20"). Ex. 1013, [0030]-[0033], Fig. 4; Ex. 2001, ¶¶ 119-20. Figure 4 of Zhou, reproduced below, illustrates Zhou's gas plasma etching apparatus treating Zhou's entire electrode 2 with a mixture of gas particles. Ex. 2001, ¶ 120.

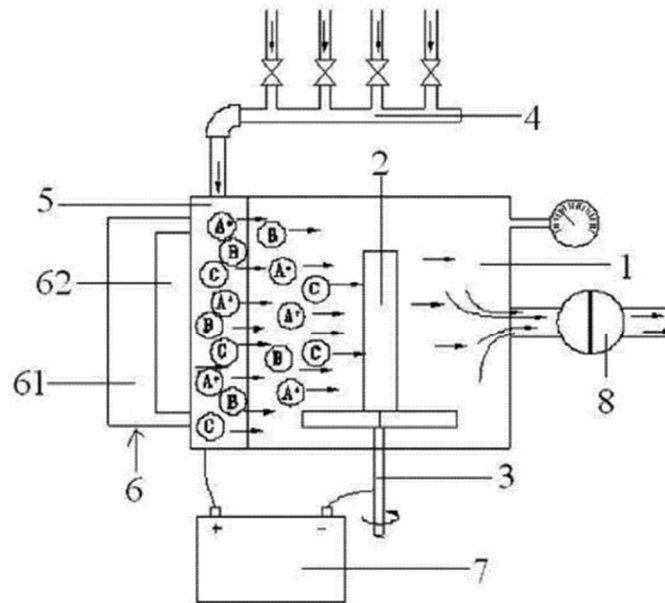


FIG. 4

Ex. 1013, Fig. 4.

Zhou's gas particles react with and etch only Zhou's current collector 10, and not Zhou's positive electrode film 20. Ex. 1013, [0033], Fig. 3; Ex. 2001, ¶ 121. As a result, Zhou's current collector 10 is "indented" relative to Zhou's electrode film along the *entire length* of Zhou's electrode, as shown by indented current collector 10 in reproduced Figs. 2 and 3 of Zhou below. Ex. 2001, ¶¶ 121.

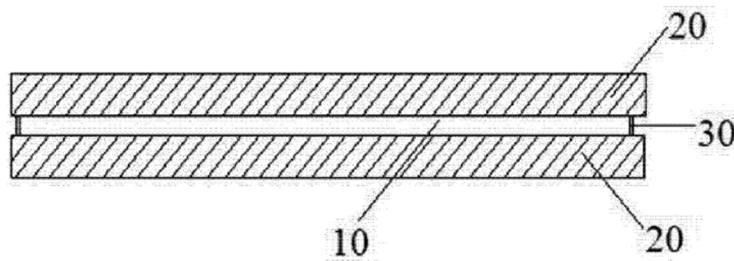


FIG. 3

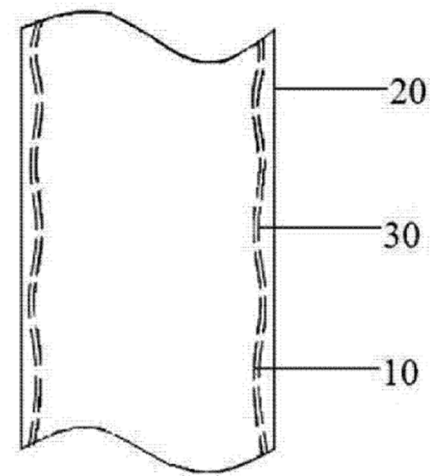


FIG. 2

Ex. 1013, Figs. 2-3.

As shown in Zhou, a "top-view diagram illustrating the present utility model" does not show a groove or notch because Zhou discloses a continuously coated electrode and the positive electrode film is specifically designed to extend past the edge of the etched current collector. Ex. 1013, [0018], Fig. 2 *compare* Pet. at 63 (illustrating an unsupported modification of Fig. 2 of Zhou); Ex. 2001, ¶¶ 122.

Zhou teaches that its indented current collector mitigates the fact that not all burrs may be removed. The indentation allows for the current collector to be

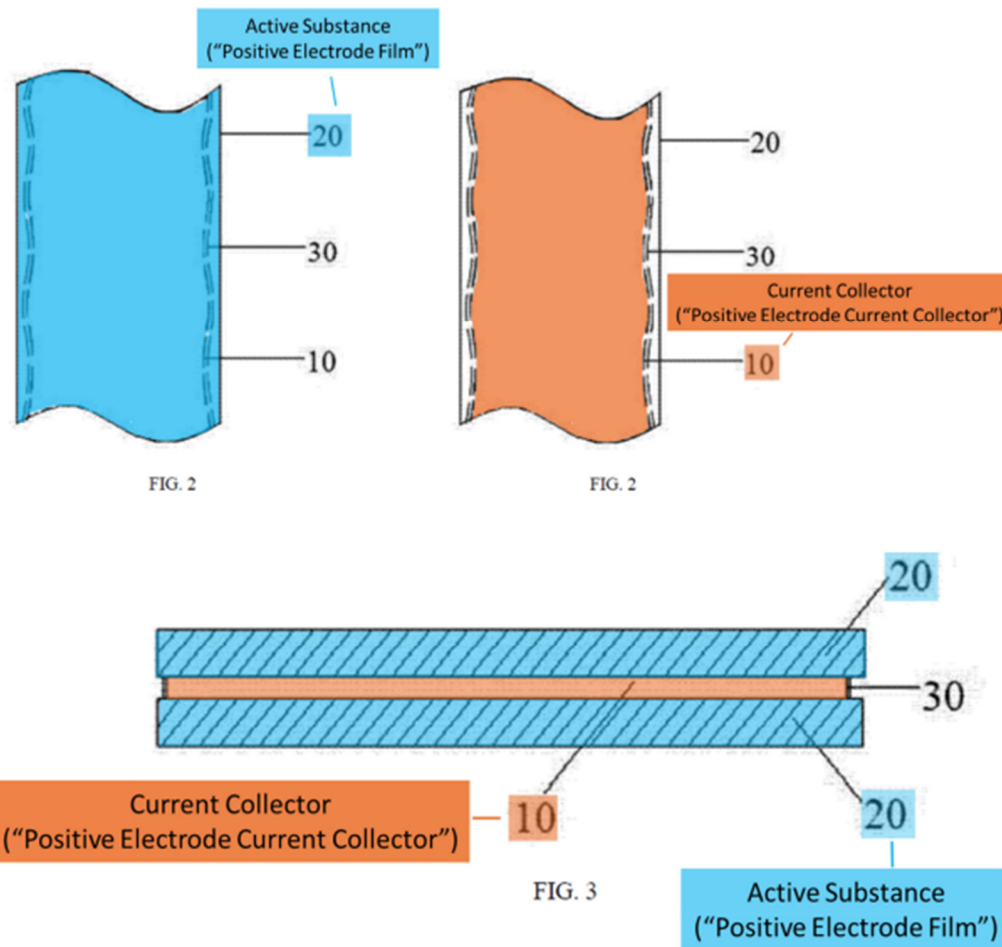
insulated by the oxide layer and further allows for the current collector to have a width that is less than the width of the positive electrode film 20 so as to prevent the risk of unremoved burrs or rough surfaces resulting from the etching extending out and piercing through a separator. Ex. 1013, ¶[0015]; *see also* ¶[0021] (“Having the oxide layer 30 disposed can prevent the risk of unremoved burrs or rough surfaces resulting from the etching extending out and piercing through a separator.”); Ex. 2001, ¶ 123. Indeed, Zhou discloses that the entire length of the current collector would have been etched “without affecting the shape of the edge of the positive electrode or the integrity of the positive electrode film 20 coating” so that the current collector “will not be able to pierce through the separator and short-circuit on contact with the negative electrode film.” Ex. 1013, ¶[0037]; Ex. 2001, ¶¶ 123.

Taken together, these disclosures would make apparent to a POSITA that the entire current collector is etched such that the width of the positive electrode current collector 10 is less than the width of the positive electrode film 20. Ex. 1013, ¶[0021]; Ex. 2001, ¶ 124. Etching the entire current collector such that the entire surface of the current collector would be indented at the same depth would not result in “a first electrode tab receiving groove, defined by an exposed portion of the first surface of the first current collector and the first active substance on a periphery of the first electrode tab receiving groove” and certainly would not result in an electrode tab receiving groove appearing in a top-down view of Zhou, or a first electrode plate

notch “disposed on a side edge of the first electrode tab receiving groove.” Ex. 1001, Claim 1; Ex. 2001, ¶ 124.

Petitioner also asserts that “based on Zhou’s disclosure, a POSITA would have understood that Zhou’s electrode tab receiving groove would appear in a top-down view,” apparently based on the fact that Zhou “caution[ed] against making the current collector etch depth ‘too great,’ which ‘will cause unnecessary damage to an area on the positive electrode current collector 10 that is not covered by a positive electrode active material, thereby affecting tab welding in a subsequent step.’” Pet. at 62-63; Ex. 1013 [0025]. Petitioner does not provide any basis or explanation as to why these statements support the placement of an electrode tab receiving groove illustrated in Petitioner’s unsupported figure on page 63 of the Petition. Ex. 2001, ¶ 125.

Instead, the only area of the current collector that is shown in Figures 2 and 3 of Zhou “that is not covered by a positive electrode active material” is the edge that has been treated by gas plasma etching. Ex. 1013, Figs. 2-3, [0021]; Ex. 2001, ¶ 126. Petitioner illustrates these uncovered areas in orange below:



Pet. at 62.

Regardless of the lack of any explanation in Zhou that would suggest a tab receiving groove that would appear in a top-down view, Zhou's cautions against a particular etch depth are unrelated to any suggestion to create a groove or notch in Zhou's current collector, but instead are directed to the impact of etching the entirety of current collector. Ex. 2001, ¶ 127. The purpose of Zhou's etching is to have an etch depth that allows the oxide layer to insulate the current collector such that any burrs on the current collector will not pierce through the separator. Ex. 1013, [0021]-

[0022]; Ex. 2001, ¶127. In fact, Zhou discloses: “[t]he large[r] the distance of indentation, the better the safety performance because burrs that may not have been removed and rough bumps that resulted from the gas etching are all covered by the film on the outside.” Ex. 1013, [0025].

Noting the potential of a large edge depth, Zhou discloses that etching of the entire current collector may cause “unnecessary damage to an area on the positive electrode current collector 10 that is not covered by a positive electrode active material.” *Id.* Zhou also states that its gas plasma etching method “removes the cut edge and burrs of the [current collector]... without affecting... the integrity of the [] electrode film coating,” indicating that Zhou is concerned about weakening the electrode film coating by over-etching the underlying current collector, which could result in creating particulates, a known safety hazard for lithium-ion cells. Ex. 1013, [0037]; Ex. 2001, ¶ 128. As a result, these cautions by Zhou only suggest to a POSITA that there is a need to balance the amount of the entire length of current collector that is removed for the purposes of mitigating burrs with the need to maintain the functionality and viability of the current collector. Ex. 1013, [0037]; Ex. 2001, ¶ 128. Nothing more should be or can be drawn from these disclosures. Ex. 2001, ¶ 128.

Zhou is silent with regard to any additional steps needed for internal tab welding. Ex. 1013, [0037]; Ex. 2001, ¶ 129-30. In fact, other than mentioning the

need for the current collector to not be damaged, Zhou says nothing further regarding internal tab welding, and certainly says or suggests nothing about the claimed first electrode tab receiving groove, or the claimed first electrode plate notch “disposed on a side edge of the first electrode tab receiving groove.” Ex. 1013, [0037]; Ex. 2001, ¶ 129-30. Instead, Zhou discloses that the entirety of the current collector 10 is indented as compared to the positive electrode film 20 “without affecting the shape of the edge of the positive electrode or the integrity of the positive electrode film 20 coating.” Ex. 1013, ¶[0037]; Ex. 2001, ¶¶ 130. As is shown and described in Zhou, Zhou does not disclose a First Electrode Tab Receiving Groove or First Electrode Plate Notch. Ex. 2001, ¶¶ 129-30.

(ii) **Zhou’s Burrs Present a Separate and Distinct Problem From The Problem Solved by the ’352 Patent and The Disclosure of Wang**

Petitioner’s sole rationale for the combination of Wang and Zhou is “burr removal.” Pet. at 68. As an initial matter, and as described *supra* § VI.B.1.a, Wang’s electrode tab receiving groove, which is created by “patch” or “gap” coating certain areas of its electrode strip with active material and leaving other “island areas” uncoated, does not produce burrs of the type and location alleged by Petitioner. Ex. 2001, ¶ 131. Because there are no burrs to remove from Wang’s patch coated electrodes in the location alleged by Petitioner, a POSITA would have no reason or

motivation to create the claimed first electrode plate notch in Wang's battery. *See* Pet. at 68; Ex. 2001, ¶ 131; *see supra* § VI.B.1.a.

Regardless of the disclosure of Wang, Petitioner specifically notes that “burr removal” is the reason provided by the '352 Patent for the inclusion of the notch. Pet. at 68. However, a POSITA would have understood that the “burr removal” process in the '352 Patent is separate and distinct from the “burr removal” process in Zhou. Pet. at 68; Ex. 2001, ¶ 132. As a result, the mere mention of “burr removal” in Zhou does not provide support for the proposed combination and certainly does not support Petitioner's sole rationale for the combination being that the burr removal in Zhou is the same as that of the '352 Patent. Pet. at 68-69; Ex. 2001, ¶ 132.

As explained above, these burrs of the '352 Patent are formed from the high heat of the pulsed laser beams used in laser ablation. Ex. 2001, ¶ 133. And as explained *supra* § VI.B.1.a, the '352 Patent removes these burrs via a notch at the edge part of the electrode tab receiving groove formed by laser ablation. Ex. 1001, 2:26-40, 3:50-65, 7:58-8:3, 13:43-50, 14:58-67; Ex. 2001, ¶ 133. That is, the burrs in the '352 Patent are localized to the edge part of the electrode tab receiving groove as a result of laser ablation. Ex. 1001, 2:26-40, 3:50-65, 7:58-8:3, 13:43-50, 14:58-67; Ex. 2001, ¶ 133.

Zhou discloses that its burrs form from “electrode cutting” and that its positive electrode current collector will “have edges that are level with or slightly protrude

over edges of a positive electrode film 240 and have some burrs that resulted from cutting.” Ex. 1013, [0004]. As discussed *supra* § VI.B.1.b.(i), Zhou’s “electrode cutting” is referring to what is commonly known in the industry as “slitting,” which uses knife edge wheels to slit wide electrode reels from a coater to the width required for the cells being manufactured. Ex. 2001, ¶ 134. Slitting is performed in a high-speed roll-to-roll process down the electrode web, and it is a known problem in the industry that if the knife edges used in slitting are nicked or damaged, they can cause burrs along the cut edge of the electrode. *Id.* The burrs in Zhou, thus, are of a different character in that they can occur at any point down the entire length of the current collector and are a result of slitting the electrode. *Id.*

Zhou teaches that the indented positive electrode current collector is insulated by the oxide layer on the outside so as to prevent the risk of unremoved burrs or rough surfaces resulting from the etching extending out and piercing through a separator. Ex. 1013, ¶[0015] *see also* ¶[0021] (“Having the oxide layer 30 disposed can prevent the risk of unremoved burrs or rough surfaces resulting from the etching extending out and piercing through a separator.”); Ex. 2001, ¶¶ 135.

A POSITA would have understood that burrs located along the entire length of the current collector as taught by Zhou would not be mitigated by a single groove or notch and, thus, there would be no motivation to create a groove or notch as suggested by Petitioner. Ex. 2001, ¶ 136. Instead, as disclosed by Zhou, the entire

length of the current collector would have been etched “without affecting the shape of the edge of the positive electrode or the integrity of the positive electrode film 20 coating” so that the current collector “will not be able to pierce through the separator and short-circuit on contact with the negative electrode film.” Ex. 1013, ¶[0037]; Ex. 2001, ¶ 136. As a result, a POSITA would not have considered Zhou’s “burr removal” or burr removal in general as a motivation to make the modifications asserted in the Petition. Ex. 2001, ¶ 136.

(iii) A POSITA Would (and Could) Not Etch Only a Select Area of Wang’s Current Collector Using Zhou’s Gas Plasma Etching to Form the Claimed First Electrode Plate Notch

Petitioner also asserts that:

In view of Zhou’s stated benefits of plasma etching the current collector to remove electrode burrs that could damage the battery (Ex. 1013, ¶¶[0007]-[0008], [0015]), a POSITA would have been motivated to similarly modify Wang’s electrode, including by etching a region of the current collector to which the tab of the first (e.g., anode) electrode is to be welded to the current collector. Ex. 1002, ¶147.

Pet. at 68.

Contrary to Petitioner’s assertions, a POSITA would not have been motivated to etch a localized region of Wang’s current collector using Zhou’s gas plasma etching method. Ex. 2001, ¶¶ 137-140.

As explained above, Zhou discloses using gas plasma etching to etch the entire length of an electrode's current collector edge. Ex. 1013, [0030]-[0031], Fig. 4. The gas plasma etching process described by Zhou is an expensive process to use on lithium-ion electrodes and is one that for a POSITA would likely implement for bulk processing of large electrode rolls. Ex. 2001, ¶ 139. For example, as described by Zhou, the process requires the use of a vacuum, specialized gases and a plasma generator, with the entire electrode exposed to the gas plasma for up to an hour. Ex. 1013, [0031]-[0032].

As such, a POSITA would understand that Zhou's gas plasma etching process is designed for use in bulk processing of large rolls of electrode material, to etch the entire length of the electrode or current collector edge. Ex. 2001, ¶ 140. It therefore would be difficult—if not impossible—to implement Zhou's gas plasma etching only on a select, localized region of Wang's current collector to create an alleged “first electrode plate notch,” because in order to perform such etching, a POSITA would need to first vacuum seal the selected region to be etched and then isolate the gas plasma to the narrow tab or groove area of the electrode while etching. *Id.* Zhou would not be able to require vacuum sealing a select narrow area of the electrode edge (e.g., a few millimeters width), particularly using its gas chamber apparatus in its Figure 4, including around the area coated with the active substance, especially as there would have been hundreds or thousands of such tab areas on a full

production roll of electrode material that would need such precision vacuum sealing.

Id. Therefore, not only would a POSITA not be motivated use Zhou's gas plasma etching method on a select area of Wang's current collector, but it would also be infeasible to do so. Ex. 2001, ¶¶ 138-140.

For at least these reasons, a POSITA would have understood that the modification proposed by Petitioner would not be viable.

c. Even Assuming a POSITA Would Combine Wang and Zhou as Petitioner Proposes, the Resulting Structure Does Not Disclose the First Electrode Plate Notch

Even assuming that a POSITA would combine Wang and Zhou as proposed by Petitioner, the resulting structure would not result in the claimed "electrode tab receiving groove" or "first electrode plate notch" that is "disposed on a side edge of the first electrode tab receiving groove" and which is "defined by an exposed portion of the first surface of the first current collector and the first active substance on a periphery of the first electrode tab receiving groove." Ex. 1001, Claim 1; Ex. 2001, ¶¶ 141-48.

In particular, Petitioner asserts that in its unsupported modification to Zhou's figure, Zhou discloses an electrode plate notch disposed on a side edge of the electrode tab receiving groove. Ex. 2001, ¶¶ 142. Specifically, Petitioner states:

As shown in the figure above, as a result of Zhou's current collector etching process, *Zhou's electrode tab receiving groove includes an*

electrode plate notch disposed on a side edge of the electrode tab receiving groove in the same manner that the '352 patent's "anode electrode plate die-cut notch 1014" is disposed on a "side edge" of an "anode electrode tab receiving groove 1013," as shown in '352 patent Figure 5(a) below. Ex. 1001, 3:14-45, Fig. 5a; Ex. 1002, ¶142. Moreover, as shown in annotated Zhou Figures 2 and 3 above, Zhou's notch extends entirely through the current collector (e.g., in a top-to-bottom direction in Figure 3), and thus extends through the current collector's first and second surfaces. Ex. 1002, ¶142.

Pet., 63-64.

In order to demonstrate the resulting structure, Petitioner provides an annotated and modified figure from Zhou that allegedly illustrates how the "modified Wang negative electrode would appear in a top-down view." Pet. at 63. As is shown, the current collector does not define the alleged first electrode plate notch as it would have been etched away (e.g., there is no current collector outside of the double dashed lines below). Ex. 2001, ¶ 143.

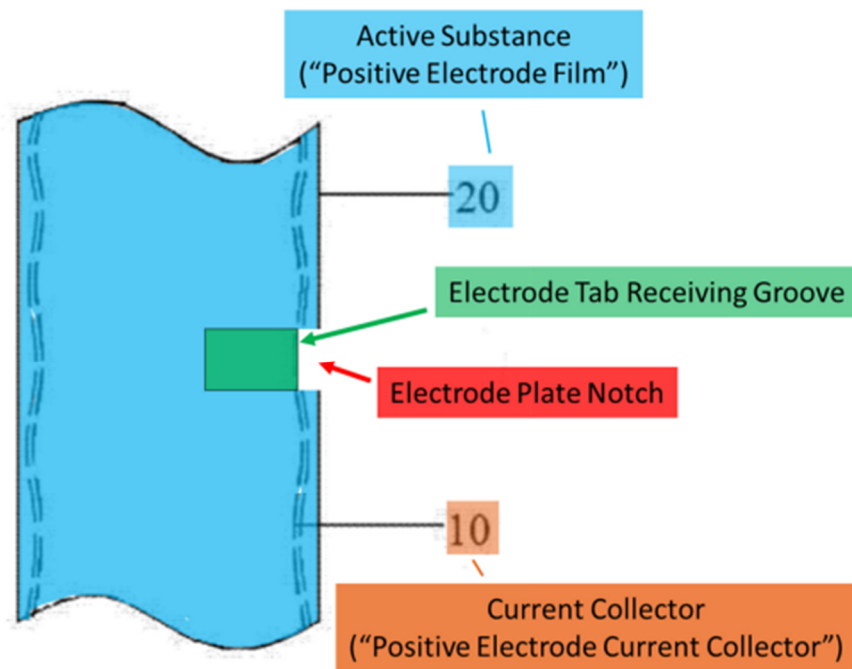
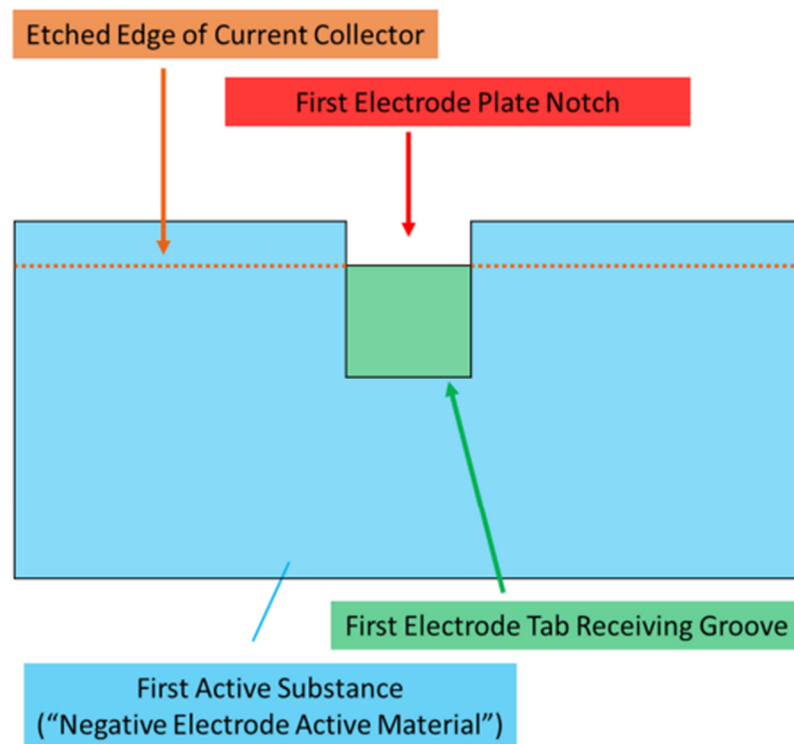


FIG. 2

Pet. at 63.

Below Petitioner adds an orange dashed line to signify where it claims the current collector ends with respect to the Negative Electrode Active Material (annotated in blue below). Ex. 2001, ¶¶ 144.



Pet. at 67.

Petitioner states “a POSITA would have understood that a notch in the modified Wang negative electrode would appear in a top-down view as shown in the figure [above].” Pet. at 66. Viewed from the top and according to Petitioner, the modified disclosure of Wang would include an “Etched Edge of Current Collector” such that the current collector is narrower, when viewed from the top, than the “Negative Electrode Active Material.” *Id.* at 66-67. As a result, outside of the “Etched Edge of Current Collector,” there no longer is any current collector remaining. Ex. 2001, ¶ 145. That is, past the “Etched Edge of Current Collector,” there is nothing between layers of “Negative Electrode Active Material.” *Id.*

However, to be the claimed “first electrode plate notch,” the notch must “extend[] through the second surface and the first surface of the first current collector.” Ex. 1001, Claim 1. A POSITA would understand that the area defined by Petitioner as the “First Electrode Plate Notch” does not “extend[] through the second surface and the first surface of the first current collector” because the current collector has been etched away along the entirety of the current collector above the dashed orange line. Pet. at 67; Ex. 2001, ¶ 146.

Moreover, the “first electrode plate notch” must be “disposed on a side edge of the first electrode tab receiving groove” that is “defined by an exposed portion of the first surface of the first current collector and the first active substance on a periphery of the first electrode tab receiving groove.” Ex. 1001, Claim 1. But Petitioner’s unsupported first electrode plate notch in its figure above cannot be “disposed on a side edge of the first electrode tab receiving groove” because it is located in the region above the dashed orange line—where there is no current collector—and thus *cannot be and is not* “disposed on a side edge of the first electrode tab receiving groove” that is “*defined by an exposed portion of the first surface of the first current collector and the first active substance on a periphery of the first electrode tab receiving groove.*” Ex. 1001, Claim 1; Ex. 2001, ¶ 147. In other words, there can be no first electrode tab receiving groove in the area above the dashed line, and as such there can be no first electrode plate notch there. Ex.

2001, ¶ 147. In addition, claim 1 confirms that the “first active substance” is “disposed on a first surface of the first current collector and a second surface of the first current collector.” Ex. 1001, Claim 1. However, a POSITA would have understood that the positive electrode film in the modified Wang figure above is not “disposed on a first surface of the first current collector and a second surface of the first current collector” because the current collector in that section has already been etched away as is admitted in Petitioner’s figure. Pet at. 67; Ex. 2001, ¶ 147.

In sum, a POSITA would have understood that once the current collector in Wang is etched along its entire length, as is required by Zhou and admitted by Petitioner to be part of its proposed combination, any area above the dashed orange line in Petitioner’s proposed combination cannot house the first electrode tab receiving groove, and thus cannot house the first electrode plate notch, so Wang’s “Negative Electrode Active Material” would no longer be disposed on a first surface of the current collector. Ex. 1001, Claim 1; Ex. 2001, ¶ 148. Moreover, once the current collector was etched, any alleged notch in Zhou would not extend through “the second surface and the first surface of the first current collector.” Ex. 1001, Claim 1; Ex. 2001, ¶ 148. For this additional reason, the combination fails to teach or suggest claim 1.

2. Claims 2-3, and 5-12 Are Not Unpatentable

Claims 2-3 and 5-12 are not unpatentable for the same reasons as discussed above with respect to claim 1 and at least because they depend from claim 1. Ex. 2001, ¶ 149. Patent Owner reserves the right to address claims 2-3 and 5-12 individually if this proceeding is instituted.

VII. THE BOARD SHOULD NOT INSTITUTE INTER PARTES REVIEW UNDER § 314(A) BASED ON THE *FINTIV* FACTORS

In addition to the underlying failures of the Petition, the Board should deny institution under *Apple v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020) (precedential).

Factor 1 is neutral. In the Eastern District of Texas where Patent Owner is asserting the '352 Patent against Petitioner, a stay pending institution of this IPR has not been requested, and even if requested is unlikely to be granted. The Board should not infer the outcome of such a motion. *Sand Revolution II LLC v. Continental Intermodal Grp. – Trucking LLC*, IPR2019-01393, Paper 24 at 7 (P.T.A.B. June 16, 2020) (informative).

Factor 2 weighs against institution because jury selection is already scheduled to occur in the district court on February 5, 2024, about nine months *before* the October, 28, 2024 statutory deadline for the Board to issue a final written decision in this IPR (assuming that the Board issues an institution decision on October 28,

2023). Ex. 1015. Even Petitioner agrees that trial will occur prior to final written decision when considering median time-to-trial. Pet. at 101. The Board has denied institution in view of similar or smaller gaps between the final written decision and trial. *See, e.g., EClinicalWorks, LLC v. Decapolis LLC*, IPR2022-00229, Paper 10 at 9 (P.T.A.B. Apr. 13, 2022) (finding this factor weighed in favor of discretionary denial and denying institution where “the beginning of the jury trial in the WDTX Cases is roughly one or two months before any final decision would have been due had *inter partes* review been instituted”); *Samsung Elecs. Co., Ltd. v. California Inst. of Tech.*, IPR2023-00130, Paper 10 at 16 (P.T.A.B. May 4, 2023) (finding this factor weighed in favor of discretionary denial and denying institution where trial in the underlying litigation would commence approximately eight months under the court’s scheduling order, or approximately five months under the time-to-trial statistics for the court, before the expected date of the final written decision); *Roku, Inc. v. IOENGINE, LLC*, IPR2022-01553, Paper 11 at 10-11 (P.T.A.B. May 5, 2023) (finding this factor weighed in favor of discretionary denial and denying institution where trial in the underlying litigation would commence approximately seven months under the court’s scheduling order, or approximately six months under the time-to-trial statistics for the court, before the expected date of the final written decision).

Factor 3 also weighs against institution because the Petition was filed late (over nine months after CosMX was sued for infringement), there are significant ongoing efforts in the parallel litigation, and there will be significant efforts that will be expended by the expected institution decision date of October 28, 2023. For example, fact discovery has been ongoing since December 2022 and will close in mid-September 2023, before the expected institution decision date. Specifically, the parties took six depositions of both fact and expert witnesses in June 2023 alone, on topics relating to claim construction, validity, conception, reduction to practice, inventorship, working examples, practicing products, and document retention, many of which are also topics under Fed. R. Civ. P. 30(b)(6). By late October, Patent Owner will have taken at least six additional depositions of CosMX witnesses. Most of these depositions have been (and will be) taking place in Hong Kong due to local laws, with dozens of witnesses and counsel flown from China and the U.S. each time. Meanwhile, the parties have already produced a combined total of over *two million* pages of documents. Third-party discovery is also ongoing, with over fifteen third-parties subpoenaed to date. The parties have also disclosed at least seven expert witnesses, and by end of August, will be working toward their initial expert reports due on September 18, 2023. Even expert discovery will close on October 23, 2023, which is before a decision on institution is expected.

By mid-August, the district court will have already held its *Markman* hearing and the parties will be working towards pretrial dispositive motions (due October 30, 2023). In short, the parallel district court litigation is *already* in an advanced stage and will be even more advanced by the time an institution decision is expected to issue. *See Samsung*, Paper 10 at 17-18.

Factor 4 also weighs strongly against institution because Wang, Deng and Zhou, are also being asserted by Petitioner in its Invalidity Contentions at the Eastern District of Texas (where trial will be long complete before any final written decision here). In addition, there is substantial overlap in how these references are being asserted at the district court, and in this IPR—for example, Petitioner points largely to the same disclosures in each prior art reference, in both the district court, and in this IPR. Petitioner has not filed a stipulation.

Factor 5 also weighs against institution because the Petitioner is the accused infringer and defendant, while Patent Owner is the plaintiff, in the district court litigations. Ex. 1014, 1; Ex. 2010, 1.

Factor 6 weighs against institution because the Petition is weak. Not only do Deng and Zhou, the secondary primary references that Petitioner relies on as allegedly teaching the claimed first electrode plate notch, not actually disclose the claimed notch, but Petitioner provides no reason or motivation why a person of ordinary skill in the art would have modified Wang, the primary reference in both

grounds, with Deng and Zhou. In addition, even when Wang is separately modified by Deng or Zhou as proposed by Petitioner, the resulting structure does not disclose the claimed first electrode plate notch. Given that these numerous deficiencies fail to meet the *likelihood of success* standard, they certainly fail to meet the higher *compelling* standard, which requires challenges “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.” *Commscope Techs. LLC v. Dali Wireless, Inc.*, IPR 2022-01242, Paper 23 at 3 (P.T.A.B. Feb. 27, 2023) (citing USPTO Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation at 4. (June 21, 2022) (“Guidance Memo”).)

VIII. CONCLUSION

For the reasons noted above, Patent Owner respectfully submits that the Board should deny institution of all Grounds of the Petition.

Dated: July 28, 2023

Respectfully submitted,

By: / Christopher TL Douglas /
Christopher TL Douglas, Reg. No. 56,950

CERTIFICATION UNDER 37 C.F.R. §42.24

Pursuant to 37 C.F.R. §42.24(d), I certify that this reply complies with the type-volume limits of 37 C.F.R. §42.24(c)(1) because it contains 13,848 words, according to the word-processing system used to prepare this reply, excluding the parts of this reply that are exempted by 37 C.F.R. §42.24(c) (including the table of contents, a table of authorities, a listing of facts which are admitted, a certificate of service or this certificate word count, and appendix of exhibits).

Dated: July 28, 2023

By: / Christopher TL Douglas /
Christopher TL Douglas

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §42.6(e), the undersigned hereby certifies that a copy of the foregoing **PATENT OWNER'S PRELIMINARY RESPONSE** was served by filing this document through the PTAB's E2E Filing System as well as delivering a true and correct copy by electronic mail on Patent Owner's lead and backup counsel at the following email addresses (as agreed by counsel for Patent Owner):

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Dated: July 28, 2023

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Christopher TL Douglas