

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

IPR2025-00389
Patent 11,923,498

PATENT OWNER'S PRELIMINARY RESPONSE

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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)	10

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Exhibit Number	Description
2001	Second Amended Complaint, <i>Ningde Amperex Tech. Ltd. v. Zhuhai CosMX Battery Co.</i> , Case No. 2:24-cv-00728-JRG, ECF No. 23 (E.D. Tex. Jan. 28, 2025)
2002	Scheduling Order, <i>Ningde Amperex Tech. Ltd. v. Zhuhai CosMX Battery Co.</i> , Case No. 2:24-cv-00728-JRG, ECF No. 27 (E.D. Tex. Feb. 6, 2025)
2003	CosMX Invalidity Contentions Cover Pleading, <i>Ningde Amperex Tech. Ltd. v. Zhuhai CosMX Battery Co.</i> , Case No. 2:24-cv-00728-JRG (E.D. Tex. Jan. 7, 2025)
2004	Summons to attend oral proceedings in German Case No. 3 Ni 12/23 (EP) (“Germany Order 1”)
2005	Summons to attend oral proceedings in German Case No. 3 Ni 12/24 (EP) (“Germany Order 2”)
2006	Docket Navigator Statistics for Judge Rodney Gilstrap (accessed May 5, 2025)
2007	Docket, <i>Ningde Amperex Tech. Ltd. v. Zhuhai CosMX Battery Co.</i> , Case No. 2:22-cv-00232 (E.D. Tex.)
2008	Joint Motion for Entry of Protective Order, <i>Ningde Amperex Tech. Ltd. v. Zhuhai CosMX Battery Co.</i> , No. 2:24-cv-00728-JRG, ECF No. 30 (E.D. Tex. Feb. 11, 2025)
2009	Amended Final Judgment, <i>Ningde Amperex Tech. Ltd. v. Zhuhai CosMX Battery Co.</i> , Case No. 2:22-cv-00232, ECF No. 427 (E.D. Tex.)
2010	Article, <i>Lithium battery manufacturer ATL won injunction against its Chinese rival COSMX in German Court</i> , China IP Today (April 6, 2024)
2011	Reserved
2012	Reserved
2013	Darts IP Reports: CN109301326, CN104466097, CN206490141, CN108352492 (May 6, 2025)
2014	Reserved
2015	Declaration of James L. Kaschmitter, Ph.D.
2016	<i>Curriculum Vitae</i> of James L. Kaschmitter, Ph.D.
2017	Papers and Presentations of James L. Kaschmitter, Ph.D.

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 1-22 (the “Challenged Claims”) of U.S. Patent No. 11,923,498 (the “’498 Patent,” Ex. 1001). The Petition should be rejected and institution should be denied for numerous reasons.

First, for every asserted Ground, Petitioner’s case relies on a reference, Takemura, that itself disparages the use of tape and, thus, undercuts the proposed combination. *See Galderma Labs., L.P. v. Tolman, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013) (the prior art teaches away “when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken” in the claim). Petitioner’s reliance on Takemura and, the unsupported allegations of obviousness based on it, must be discarded. Indeed, Takemura explicitly teaches that “the presence of extra active material and **masking tape** in [the] positions [of FIGS. 8 and 9] leads to a decrease in energy density, an increase in the overall thickness of the battery.” *Id.* ¶ [0010] *see also id.* ¶ [0035] (explaining that **extra space** readily occurs . . . due to the thickness of current collector terminals 1, 2 **and the insulating tape**

7.”). That is, Takemura would inform a POSITA that the location and size of the tape specifically relied on by Petitioner leads to a decrease in energy density and an increase in the overall thickness, two points that Petitioner and its expert ignore throughout its analysis, especially when its expert reaches the conclusion that *more* tape should be added.¹

Second, for all Grounds, not only does Petitioner rely on the tape that Takemura disparages, Petitioner argues based on expert testimony alone that a POSITA would *expand* the length of tape. Pet. 38. This argument flouts the teachings of Takemura itself, which seeks to minimize the amount of tape used or eliminate it altogether. Petitioner and its expert rely on the very tape that Takemura disparages when it asserts that “Takemura does not illustrate that the insulating tape has a length larger than the length of the exposed metal on the negative electrode current collector, a *POSA would have done so* (or at least found it obvious) to

¹ Takemura’s solution is to *minimize* or *eliminate* the use of tape, not increase its coverage. Ex. 1006 ¶ [0035]. Instead of using tape to prevent lithium deposition, Takemura teaches removing the active layer, thereby avoiding the “extra space” caused by the tape. Ex. 1006 ¶¶ [0035] (teaching removing tape to eliminate “extra space”), [0019] (teaching the uncoated portion “prevents lithium metal deposition”)

minimize exposing the negative electrode metal to lithium ions released from the positive active material.” Pet. at 38.

Third, Grounds 1 and 4 fail for the additional reason that the primary reference, Sato discloses only a battery with a single electrode having a recess. Sato never discloses a battery with an electrode having a first recess and another electrode having a “second recess.” Petitioner relies on Sato to disclose a positive lead within a recess, and maps that recess to the claimed “first recess.” Pet. at 26-27. Similarly, Petitioner relies on Sato to disclose a negative lead within a recess, and maps that to the claimed “second recess.” Pet. at 29-30. But Sato *never discloses an embodiment with an electrode having a first recess and another electrode with a “second recess”*—only two different configurations of batteries, each with only *one electrode having a recess*: (1) one configuration having a recess on the positive electrode and no recess on the negative electrode and (2) another configuration having a recess on the negative electrode with no recess on the positive electrode. Ex. 1005 ¶¶ [0104], [0111], [0136]–[0137], [0148]. Petitioner, however, fails to explain whether, how, or why a POSITA would combine the multiple alternative embodiments of Sato—each of which has only one electrode with a recess. Pet. at 26-27, 29-30. This failure is fatal to Grounds 1 and 4. *In re Stepan*, 868 F.3d 1342, 1345–46 n.1 (Fed. Cir. 2017) (When “combining multiple embodiments from a single reference, or selecting from large lists of elements in a single reference, there

must be a motivation to make the combination and a reasonable expectation that such a combination would be successful, otherwise a skilled artisan would not arrive at the claimed combination.”).

Fourth, even if a POSITA were to ignore the teaching away in Takemura and did combine Takemura with Oh-539 for Ground 7, this Ground fails for the additional reason that the resulting combination still would not include placing the “second insulating glue layer” at the claimed location. Petitioner relies on Takemura for disclosing the tape “opposite to the second recess,” in Figures 8 and 9. Pet. at 98-100. Petitioner then relies on Oh-539’s location of leads within the recesses. *Id.* at 100. Petitioner claims that “[i]n combining Oh-539’s central placement of the negative lead connection with Takemura, a POSA would have likewise shifted Takemura’s tape on the surface of positive active material layer to remain opposite the negative lead connection to shield the exposed metal surfaces of the negative lead connection from lithium plating.” Pet. at 99-100. However, when combining Takemura’s tape with Oh-539’s central lead placement, a POSITA would instead shave off the active material (as taught by Takemura) such that no tape remains. Ex. 1006 ¶ [0019]. Takemura teaches removing active material to form “an active material uncoated portion, which prevents lithium metal deposition.” *Id.* In fact, Petitioner’s hypothetical combination of Takemura’s tape with the central recesses of Oh-539 is contradicted by Takemura’s actual teaching for how and where tape

should be placed in a battery with centrally located recess. *Id.* ¶ [0022] (“The positive electrode active material layer 3 opposite the beginning of the *winding end* of the negative electrode is covered with insulating tape 7 to prevent lithium metal deposition”). As such, Petitioner’s combination in Ground 7 fails.

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 ’498 Patent is unpatentable and because denial is warranted in the interests of efficiency and fairness.

II. BACKGROUND

A. Technology Overview

A battery is a device that converts chemical energy directly into electrical energy. Ex. 2015 ¶ 37. The basic electrochemical unit is called a “cell,” which consists of two electrodes—one called the negative electrode or anode, and the other called the positive electrode or cathode—a separator, an electrolyte, and a container. *Id.* A secondary battery, also referred to as a rechargeable battery or storage battery, is a type of electrical battery that can be charged, discharged, and recharged multiple times. *Id.*

When the cell is discharged, lithium atoms in the negative active material are oxidized and released into the electrolyte. *Id.* ¶ 41. The lithium ions move through the electrolyte to the cathode and intercalate into the positive active material. *Id.*

Oxidation of the lithium atoms in the negative active material releases electrons into the current collector and the lead, which is in electrical communication with the current collector, carries the electrons through the external circuit, thereby generating an electric current. *Id.* During charging, lithium ions are deintercalated from the positive active material and returned to the anode by the reverse electrochemical process. *Id.*

A phenomenon called “lithium plating” occurs when the Li-ions cannot intercalate into the anode and so are deposited as metallic lithium on the surface of a battery’s anode, creating an unsafe condition which can cause battery failure, fire, or explosion. *Id.* ¶ 42.

B. Overview of the ’498 Patent

The ’498 Patent discloses lithium-ion batteries that solve identified problems in the prior art. For example, leads can cause an increase in thickness which limits energy density. Ex. 1001, 1:36-48. Recesses in active material can be used to reduce the thickness of the battery. *Id.*, 1:52-54. But while recesses can reduce thickness, they create additional problems such as thickness variation around the corners of the recesses, high internal electrical resistance, and safety performance issues due to lithium precipitation. *Id.*, 1:49 – 2:3. Due to the particular arrangement of leads, recesses, and insulating tape, the ’498 Patent provides an efficient, dense battery, while effectively balancing reliability issues:

Compared with the prior art, due to the arrangement of the first insulating glue layer formed on the upper and lower surfaces of the positive lead and the second insulating glue layer pasted on the surface of the positive film corresponding to the second recess, occurrence of internal short circuit and lithium precipitation in the lithium-ion battery is remarkably reduced, and safety performance of the lithium-ion battery is improved remarkably in the premise of desirable energy density.

Ex. 1001, 4:57-65. In particular, the '498 Patent claims:

A lithium-ion battery, comprising:

a positive electrode comprising a positive current collector and a positive electrode active material layer containing LiCoO_2 , wherein the positive electrode active material layer is formed on the positive current collector, the positive electrode active material layer being provided with a first recess accommodating a positive lead being coupled with the positive current collector;

a negative electrode comprising a negative current collector and a negative electrode active material layer containing graphite or silicon, wherein the negative electrode active material layer is formed on the negative current collector, the negative electrode active material layer being provided with a second recess accommodating a negative lead being coupled with the negative current collector;

a separator disposed between the positive electrode and the negative electrode; and

an electrolyte,

wherein, a top surface of the positive lead is provided with a first insulating glue layer, a surface of the positive electrode active material layer opposite to the second recess across the separator in a thickness direction of the positive plate and the negative plate is pasted with a second insulating glue layer, the second insulating glue layer has a width larger than a width of the second recess, and the second insulating glue layer has a length larger than a length of the second recess.

Id., Claim 1.

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

Each of the arguments below should be considered from the standpoint of a person of ordinary skill in the art (“POSA”) in the field of the ’498 Patent. For purposes of this Patent Owner’s Preliminary Response, Patent Owner adopts the definition proposed by Petitioner. Patent Owner reserves the right to further address the level of ordinary skill in the art if this proceeding is instituted.

V. CLAIM CONSTRUCTION

Petitioner puts forth no claim construction positions in the Petition. Pet. at 10. While Patent Owner reserves all rights to dispute the constructions advanced in Petition, no claim construction is necessary to deny institution because Patent Owner’s arguments for denial do not rely on the outcome of an actual controversy about claim interpretation and fail even under Patent Owner’s constructions. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed to the extent necessary to resolve the controversy”). The failure to render obvious the claims is clear in view of the arguments below without construing any specific claim term or phrase.

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

**A. Ground 1: Sato and Takemura Do Not Render Obvious Claims 1-
3, 6, 8, 17, and 19**

Petitioner fails to establish there is a reasonable likelihood at least one challenged claim of Ground 1 is unpatentable, for the reasons below. Ex. 2015 ¶¶ 56-96. Specifically, Petitioner fails to establish the proposed combination renders obvious independent claim elements [1.D], [17.D], [1.I], and [17.I].

**1. The Petition Fails to Show That Sato and Takemura Render
Obvious Claim 1**

**a. Takemura Teaches Away from the Arrangement of
Tape in FIGS. 8 and 9, Which Show the Prior Art
Takemura Claims to Improve Over**

Petitioner relies on Sato as a primary reference, arguing Sato discloses most of the elements of claim 1—for example, a “battery,” “negative electrode,” “separator,” “positive electrode,” “first recess,” “second recess,” and “first insulating glue layer.” EX1003 ¶¶115-137. Petitioner explicitly acknowledges that Sato does not disclose certain elements (e.g., [1.I])² pertaining to the claimed “second insulating glue layer,” at least regarding its sizing as compared to a second recess:

² Petitioner also acknowledges Sato does not disclose elements 9.I.2 and 17.I

Sato discloses an additional polypropylene adhesive tape. *Sato is silent about the adhesive tape having a width larger than a width of the second recess and a length larger than a length of the second recess.*

However, this insulating tape sizing was known, as Takemura disclosed.

Pet. 36 (Ground 1 analysis for elements [1.I] and [17.I], internal citations omitted); Ex. 1003 ¶ 149; Ex. 2015 ¶ 59; *see also* Pet. at 71 (Ground 4 analysis for element [9.I.2] relying on Ground 1 analysis for elements [1.I] and [17.I]), 102-103 (Ground 7 analysis for elements [1.I], [9.I.2], and [17.I] relying on Ground 1 analysis for elements [1.I] and [17.I]).

To address Sato's shortcomings, Petitioner, without explanation, relies solely and entirely on the background section of Takemura and, specifically, the so-called background or prior art tape as shown in Takemura's Figures 8 and 9. Ex. 1003, 36-38. Petitioner also relies on the following analysis of its expert, Dr. van Sacken:

As illustrated in both Takemura's Figure 8 and Figure 9, the insulating tape 7 is sized such that it overlaps (i) *all* the exposed metal on the negative current collector 6 and (ii) the edge of the negative active material 4 above and below the negative lead 2.

Thus, Takemura explicitly discloses that the insulating tape 7 has a width (measured along the length of the negative electrode cross-section in Figures 8-9) larger than the exposed metal on the negative current collector 6.

Ex. 1003 ¶¶ 150-151; Pet. 36-37. Dr. van Sacken likewise fails to appreciate that he is referring to the background of Takemura. Petitioner does not rely on Sato at all for disclosing the size of the “second insulating glue layer” (Pet. 36 discussing element [1.I]), because Sato only passingly in one sentence mentions “a polypropylene adhesive tape in order to prevent lithium deposition,” but provides no description or illustration whatsoever on the sizing of the tape, nor does it provide any description for how it would be sized to prevent lithium deposition while balancing energy density. Ex. 1005 ¶ [0137].

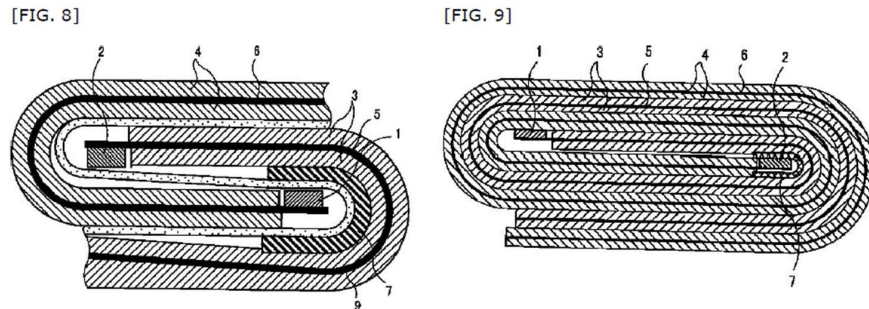
Failing to appreciate the significance of its citation to the Takemura background, Petitioner argues that a POSITA would be motivated to combine the tape of Takemura’s background comparative examples over which Takemura improved (*i.e.*, Figures 8 and 9) with Sato’s battery to prevent lithium plating. Pet., 22; Ex.1003 ¶ 112. That is, Petitioner erroneously alleges that the POSITA would be motivated to ***use more*** tape than that suggested by Takemura. Pet., 19, 38. But a POSITA would not be motivated to ***use more*** tape in view of Takemura because Takemura teaches away from doing so. Ex. 2015 ¶¶ 62-71.

Petitioner and its expert are relying only on the background of Takemura and neither takes into account the complete disclosure of Takemura. Ex. 2015 ¶ 62; Ex.1003 ¶¶ 150-151; Pet. 36-37. Specifically, Petitioner and Dr. von Sacken

overlook the fact that Takemura disparages the use of tape and, thus, undercuts the proposed combination by explicitly teaching that a POSITA should *minimize* or *eliminate* the use of tape—that is, Takemura is clear that a POSITA should *not* use the structures depicted in Figs. 8 and 9. *See Galderma Labs., L.P. v. Tolman, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013) (the prior art teaches away “when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken” in the claim); Ex. 2015 ¶ 62.

Takemura describes the tape of Figures 8 and 9 in the background section and then explicitly teaches not to use it for a variety of reasons. Ex. 1006 ¶¶ [0002]–[0004], [0035]; Ex. 2015 ¶ 63. In fact, Takemura uses the electrode structure of Figures 8 and 9 in disfavored Comparative Example 1 against which it shows the benefits of its own invention. Ex. 1006 ¶¶ [0035] (Fig. 8 depicts an enlarged portion of Comparative Example 1), [0031] (Fig. 9 depicts Comparative Example 1), [0003] (Fig. 9 depicts a *conventional* lithium-ion battery); *see also* Tables 1 and 2 (demonstrating that Comparative Example 1 has a reduced discharge capacity compared to the examples of Takemura’s invention). Takemura describes Comparative Example 1 as a conventional lithium-ion battery with a positive and negative electrode with active material layers 3 and 4. *Id.* ¶¶ [0003], [0009], [0031] (Figure 9 depicts comparative Example 1). In this battery, the positive active

material 3 is covered with masking tape 7. *Id.* ¶ [0008]. Comparative Example 1 can be viewed in Figures 8 and 9 below.



Id., FIGS. 8, 9. Takemura explicitly disfavors Comparative Example 1, explaining how its invention achieves advantageous increases in discharge capacity and the rate of deterioration of discharge capacity after cycling as compared to Comparative Example 1, which is shown below in Tables 1 and 2. *Id.* ¶¶ [0033]–[0037], [0035].

	Example 3	Comparative Example 1
Discharge Capacity (mAh)	340	280

Table 1

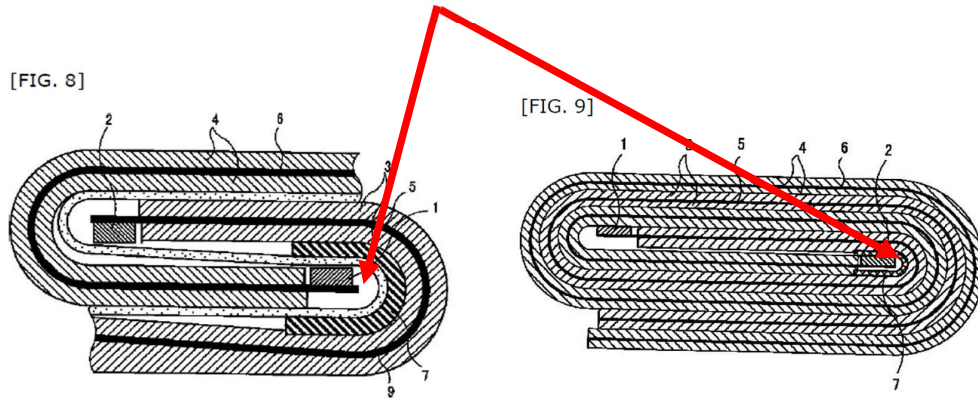
	Example 3	Comparative Example 1
Initial Discharge Capacity (mAh)	340	280
Discharge Capacity After 100 Cycles (mAh)	308	240
Deterioration (%) After 100 Cycles	90.6	85.7

Table 2

Id., Tables 1, 2.

Based on the problems with regard to Comparative Example 1, which is the battery of Figures 8 and 9 that Petitioner is relying on, Takemura disclosed *eliminating or minimizing* the use of tape. Ex. 2015 ¶ 64. Takemura explains that “[f]or the lithium-ion secondary battery shown in Fig. 9, there has been [a] demand for improvements. . . . *especially in order to make batteries smaller and thinner.*” *Id.* ¶ [0004]. Takemura describes that “[e]qually important” is to provide batteries with “higher energy densities.” *Id.* In the “Technical Problem” section, Takemura explains why the battery design of FIGS 8 and 9 and insulating tape 7 *are inadequate and prevent batteries from becoming smaller.* *Id.* ¶ [0010]. Indeed, Takemura explicitly teaches that “the presence of extra active material and *masking tape* in [the] positions [of FIGS. 8 and 9] leads to a decrease in energy density, an increase in the overall thickness of the battery.” *Id.* ¶ [0010]. In the batteries of Figures 8 and 9, “*extra space* readily occurs. . . due to the thickness of current collector terminals 1, 2 *and the insulating tape 7.*” ¶ [0035]. The extra space caused by the insulating tape 7 can be viewed below. Ex. 2015, ¶ 64.

Takemura's "Problem" of "extra space" caused by tape 7 in FIGS. 8 and 9



After highlighting problems with the tape of Comparative Example 1, Takemura provides a solution, *eliminating or minimizing* the tape, which solves the problems *caused specifically by the location and size of insulating tape 7* as

illustrated in Figures 8 and 9. *Id.* ¶¶ [0004], [0035]; Ex. 2015 ¶ 65.³ For example, in the “Solution to Problem” section, Takemura specifically describes the issues of increased thickness and lack of energy density of Figures 8 and 9 and provides its improved solution—*eliminating or minimizing* the tape. *Id.* ¶ [0035]. To “reduce excess thickness,” Takemura teaches eliminating portions of the active material and *eliminating or minimizing* insulating tape. *Id.* (teaching in Figures 8 and 9 that “extra space readily occurs in the innermost portion due to the thickness of current collector terminals 1, 2 and the insulating tape 7” but that “in FIG. 7, extra space is

³ In FIG. 4, Takemura describes using a minimal amount of tape at the *winding end* of an electrode. Ex. 1006 ¶ [0022], FIG. 4; Ex. 2015 ¶ 65, n. 2. Neither Figure 4 or its minimal use of tape is relied on by Petitioner. Regardless, the tape disclosed in Figure 4 is unrelated to the claimed “first insulating glue layer” or the claimed “second insulating glue layer.” Ex. 2015 ¶ 65, n. 2. The claims recite that the “first insulating glue layer” is provided on “a top surface of the positive lead” and that the “second insulating glue layer” is located “opposite to the second recess across the separator in a thickness direction.” Takemura’s FIG. 4 tape is not used over a lead (as in the claimed “first insulating glue layer,”) nor is it positioned opposite a recess (as in the claimed “second insulating glue layer”) or even opposite to a lead. Ex. 2015 ¶ 65, n. 2.

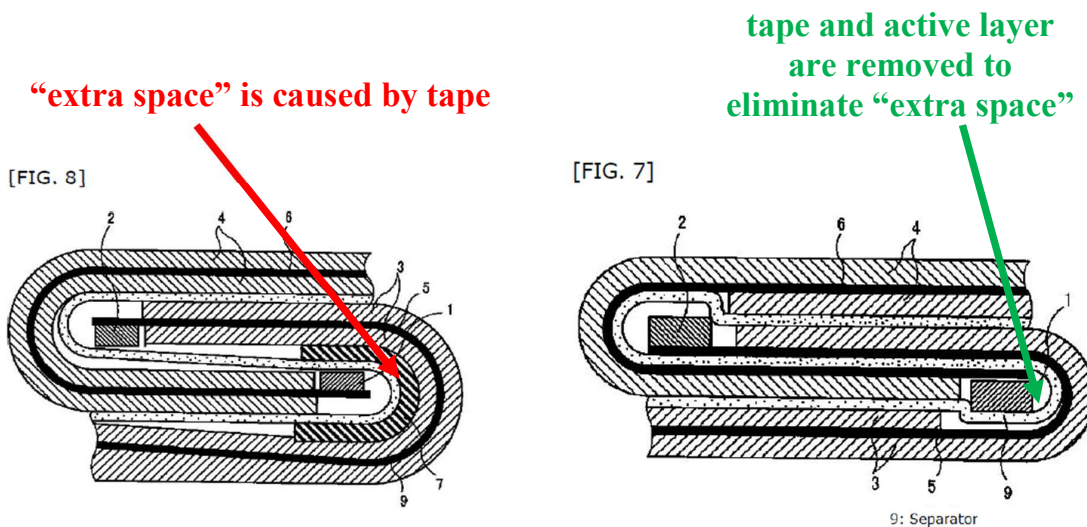
less likely to exist”). That is, Takemura is clear that the tape should be *eliminated or minimized*.

By using uncoated layers and *removing* the tape of Figures 8 and 9, Takemura teaches the POSITA that several advantages were achieved:

- “a higher discharge capacity was obtained,”
- “volumetric energy density was improved”
- “improve[d] cycle characteristics” were obtained
- “suppresse[d] battery degradation with respect to repeated use” was achieved, and
- an “extend[ed] battery life” was obtained.

Id. ¶¶ [0035]-[0036]; Ex. 2015 ¶ 66.

A comparison of Takemura's actual invention (Figure 7) compared to the disparaged use of tape in the prior art (Figure 8) is illustrated below:



Id., FIGS. 7, 8 (annotations added); Ex. 2015 ¶ 67.

In view of the advantages disclosed by *eliminating or minimizing* insulating tape and further in view of the clear disparagement of Figures 8 and 9 (and the related disclosure), Takemura teaches away from using the tape of Figures 8 and 9 (which show background art over which Takemura has improved). Ex. 2015, ¶ 68. Thus, Petitioner fails to demonstrate that a POSITA would combine Takemura's tape with the other references as proposed and, further, that a POSITA would have modified "the insulating tape [to have] a length larger than the length of the exposed metal on the negative electrode current collector." *Id.* Ex. 2015 ¶ 68.

Further, the evidence fails to support Petitioner’s conclusion that prevention of lithium deposition is a motivation to use Takemura’s tape. Ex. 2015 ¶ 69. Instead of using tape to prevent lithium deposition, Takemura teaches removing the active layer, thereby avoiding the “extra space” caused by the tape. Ex. 1006 ¶¶ [0035] (teaching removing tape to eliminate “extra space”), [0019] (teaching the uncoated portion “prevents lithium metal deposition”). Petitioner’s analysis simply ignores Takemura’s explicit suggestion to *eliminate or minimize* the use of tape and Takemura’s teachings that *removing the active layer is the preferred method to prevent lithium deposition*. Ex. 1006, § IX.C (paragraphs 108–113); Ex. 2015 ¶ 68. Takemura itself therefore undercuts Petitioner’s rationale that a POSITA would be motivated to use Takemura’s tape to prevent lithium deposition because Takemura teaches an alternative approach is better for preventing lithium deposition—removing the active layer. Ex. 1006 ¶ [0035]; Ex. 2015 ¶ 69. The Petition fails to address this teaching or offer any reason for why a POSITA would disregard it.

The errors with Petitioner’s motivation to combine analysis are made even clearer when the proposed combination is viewed as a whole. Ex. 2015 ¶ 70. Not only does Petitioner conclude that Takemura’s disfavored tape would be combined with Sato, Petitioner concludes that a POSITA would combine the existing tape in Takemura’s background figures (which Takemura teaches to *eliminate or minimize* in its invention) with *even more tape*. Pet., 31-32. Specifically, Petitioner opines that

a POSITA would combine Takemura's tape with Sato's tape which Petitioner claims to have mapped to the claimed "first insulating glue layer." Pet., 31-32; Ex. 1006 ¶ 134. Given Takemura teaches a solution of *eliminating or minimizing* tape (as discussed in detail above), Petitioner's combination, which requires more tape than that disclosed and disparaged in Takemura, contradicts the teachings of Takemura for this additional reason. Ex. 2015 ¶ 70.

In sum, Takemura disparages, and thus teaches away from, the tape placement of Figures 8 and 9, and therefore a POSA would not be motivated to combine the tape of Figures 8 and 9 of Takemura with Sato. Ex. 2015 ¶ 71.

b. Takemura does not render obvious a "second insulating glue layer" that "has a length larger than a length of the second recess"

For Claim Elements [1.I], [9.I.2], and [17.I], Petitioner admits Takemura and Sato are both *silent about the claimed length* of the "second insulating glue layer." Pet., 38 ("... *Takemura does not illustrate* that the insulating tape has a length larger than the length of the exposed metal, ..."), 36 ("*Sato is silent* about the adhesive tape having a width larger than a width of the second recess and a length larger than a length of the second recess."); *see also* Pet., 71 (Ground 4), 102-103; 102-103 (Ground 7). Petitioner then asserts that, even though Takemura *does not teach to do so*, a POSITA would *extend* the tape in Figs. 8 and 9 of Takemura so that it had "a length larger than the length of the exposed metal on the negative

electrode current collector” for several reasons. Pet., 37. That is, Petitioner is asserting that a POSITA reading Takemura would *use more tape*. But each of Petitioner’s alleged reasons for expanding the tape is undercut by Takemura itself. As such, Takemura (and Sato) do not render obvious “a second insulating glue layer” that “has a length larger than a length of the second recess” for the following several reasons. Ex. 2015 ¶ 71.

First, there is no dispute that Takemura is silent about the claimed length of the “second insulating glue layer.” Pet., 38 (“ . . . Takemura does not illustrate that the insulating tape has a length larger than the length of the exposed metal, . . .”), 36 (“*Sato is silent* about the adhesive tape having a width larger than a width of the second recess and a length larger than a length of the second recess.”). Takemura

discloses only the cross-sectional view of the battery in the width direction. Ex. 1006, FIGS. 8, 9.⁴

Despite a lack of teaching in Takemura, Petitioner asserts that a POSITA would have found it obvious to ***use more tape*** and extend the size of the tape in the ***length*** direction “to minimize exposing the negative electrode metal to lithium ions released from the positive active material.” Pet. at 36; Ex. 2015 ¶ 74. But this is inapposite to the clear disclosure of Takemura.

⁴ Even in the width direction, Takemura fails to disclose the size of its tape because “it is well established that ***patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes*** if the specification is completely silent on the issue.” *Hockerson Halberstadt, Inc. v. Avia Grp. Int’l, Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000); *Nystrom v. TREX Co.*, 424 F.3d 1136, 1149 (Fed. Cir. 2005) (finding reliance on dimensions of prior art drawings improper and concluding the district court erred to “not properly apply[] the principles set forth in our prior precedents that arguments based on drawings not explicitly made to scale in issued patents are unavailing”). While FIG. 8 and 9 show the width direction, the specification “is completely silent on the issue” of size of the tape, let alone the sizing of it with a width larger than a width of any recess as claimed. *Hockerson Halberstadt*, 222 F.3d at 95; *see generally* Ex. 1006.

As explained above, Takemura’s solution is to *eliminate* or *minimize* the use of tape—not to *increase* or *expand* its coverage or size. Ex. 1006 ¶¶ [0035] (teaching in Figures 8 and 9 that “extra space readily occurs in the innermost portion due to the thickness of current collector terminals 1, 2 and the insulating tape 7” but that when removing tape “in FIG. 7, extra space is less likely to exist”), [0010] (“the presence of extra active material and *masking tape* in [the] positions [of FIGS. 8 and 9] leads to a decrease in energy density, an increase in the overall thickness of the battery); *supra*, Section VI.A.1.a. As such, a POSITA would not have done the exact opposite of that taught by Takemura and extended the length of the tape. Petitioner’s obviousness theory fails. Ex. 2015 ¶ 75.

Takemura describes the tape of Figures 8 and 9 in the background section and then teaches not to use the battery design of these figures by making the battery of Figures 8 and 9, Comparative Example 1. Ex. 1006 ¶¶ [0002]–[0004], [0035]; Ex. 2015 ¶ 76. In fact, Takemura uses the electrode structure of Figures 8 and 9 in disfavored Comparative Example 1 against which it shows the benefits of its own invention by comparison. Ex. 1006 ¶¶ [0035] (Fig. 8 depicts an enlarged portion of Comparative Example 1), [0031] (Fig. 9 depicts Comparative Example 1) [0003] (Fig. 9 depicts a conventional lithium-ion battery); *see also* Tables 1 and 2 (demonstrating that Comparative Example 1 has a reduced discharge capacity). In Comparative Example 1, the positive active material 3 is covered with masking tape

7. *Id.* ¶ [0008]. Takemura explicitly disfavors Comparative Example 1, explaining how Takemura’s invention, eliminating or minimizing tape, achieves advantages over this invention including discharge capacity and the rate of deterioration of discharge capacity over time as shown in Tables 1 and 2. *Id.* ¶¶ [0033]–[0037], Tables 1, 2.

Takemura teaches that the tape in Comparative Example 1 causes a number of problems. Ex. 2015 ¶ 77. “For the lithium-ion secondary battery shown in Fig. 9, there has been [a] *demand for improvements . . . especially in order to make batteries smaller and thinner.*” Ex. 1006 ¶ [0004]. In the “Technical Problem” section, Takemura explains why the battery design of FIGS 8 and 9 and insulating tape 7 *are inadequate and prevent batteries from becoming smaller.* *Id.* ¶ [0010]. Indeed, Takemura explicitly teaches that “the presence of extra active material and *masking tape* in [the] positions [of FIGS. 8 and 9] leads to a decrease in energy density, an increase in the overall thickness of the battery.” *Id.* ¶ [0010]. In the batteries of Figures 8 and 9, “*extra space* readily occurs . . . due to the thickness of current collector terminals 1, 2 *and the insulating tape 7.*” ¶ [0035]. The extra space caused by the insulating tape 7 can be viewed below.

Second, Petitioner’s assertions are further undercut because Takemura does not disclose using tape in a recess at all. Ex. 2015 ¶ 78. Instead, Figures 8 and 9 depict tape around a winding end at the “innermost portion.” Ex. 1006 ¶ [0035] (“In

Comparative Example 1, as shown in the enlarged central portion of the electrode structure in FIG. 8, extra space readily occurs in the innermost portion due to the thickness of current collector terminals 1, 2 and the insulating tape 7”). A POSITA would understand that an end is not a recess. Ex. 2015 ¶ 77. Indeed, these winding ends are different than the recesses of the ’498 Patent, each of which occur in the middle of the electrode. Ex. 1001, 5:24-30 (describing distance between recess and end of electrode), 6:60-7:2 (same), 7:27-36 (same), 7:60-8:3 (same), 8:15-25 (same), FIGS. 1 – 5 (showing recesses in middle). Unlike Figures 8 and 9 of Takemura, the recesses of the ’498 Patent are bounded on both sides by an active material layer. *Compare id. with* Ex. 1006 ¶ [0035], FIGS. 8, 9. Indeed as Claim 1 recites, the active material layer is “provided with” a second recess that has both a “width” and a “length.” In contrast, the active material layer Figures 8 and 9 of Takemura ends, the winding end is entirely outside of the active material layer and therefore has no boundary defining a width. Ex. 1006 ¶ [0035], FIGS. 8, 9.

Third, tape placement and sizing is a complicated matter. Ex. 2015 ¶ 79. As Dr. Kaschmitter explains, the tape commonly used in lithium-ion cells is typically ~25-50 microns thick. Ex. 2015 ¶ 78. This thickness can become problematic when the tape is not sized and positioned carefully. Ex. 2015 ¶ 78. As Takemura also teaches, tape can cause extra thickness (i.e., bulging) around the tape that decreases the density of the battery. *Id.*; Ex. 1006 ¶ [0010]. Neither Petitioner nor its expert

consider these complications and the impact on such complications on the battery itself.⁵ Thus, for this additional reason, a POSITA would be dissuaded from adding any more insulating tape than was strictly necessary due to the cost of decreased energy density. Ex. 2015 ¶ 79.

In sum, Takemura fails to disclose the length of its tape, let alone disclose or render obvious tape that is longer than the second recess. Ex. 2015 ¶ 80.

c. Sato does not disclose a battery with both a “first recess” and a “second recess”

As explained below, Sato discloses a battery with a single electrode having a recess. Sato never discloses a battery with an electrode having a “first recess” and another electrode having a “second recess”—only two different configurations of batteries, each with only one electrode having a recess: (1) one configuration having a recess on the positive electrode and no recess on the negative electrode and (2) another configuration having a recess on the negative electrode with no recess on the positive electrode. Ex. 2015 ¶ 81. The Petition fails to address the differences

⁵ Takemura explains, even before adding the extra tape that Petitioner proposes, that “the presence of extra active material and *masking tape* in [the] positions [of FIGS. 8 and 9] leads to a decrease in energy density, an increase in the overall thickness of the battery.” *See id.* ¶ [0010].

between these two configurations or why a POSITA would allegedly combine the different disclosures of different embodiments within Sato or expect success when doing so.

Petitioner erroneously asserts that Sato discloses a battery with both a “first recess” on the positive active material layer and “a second recess” on the negative active material layer. Petitioner relies on a first embodiment of Sato to disclose a positive lead within a recess and claims to map that recess of the first embodiment to the claimed “first recess”:

Sato provides the positive active material layer (4B/9) with a first recess with an exposed portion 12/14 defined where “the mixture layer 9 is not formed on each of both surfaces of the current collector 10.” EX1005, ¶[0039]. Sato’s positive lead is coupled to positive electrode 4 by an extension lead 11/4L “connected to one of the surfaces of the exposed portion 12” of current collector 10. EX1005, ¶¶[0039], [0093], [0111]- [0113]; EX1003, ¶¶120-122, 176.

Pet. at 26-27.

Similarly, Petitioner relies on a different second embodiment of Sato to disclose a negative lead within a recess, and claims to map that recess of the second embodiment to the claimed “second recess”:

Sato provides the negative active material layer (5B/9) with a second recess with exposed portion 12 defined where “the mixture layer 9 is not formed on each of both surfaces of the current collector 10.”

EX1005, ¶[0039]. Sato's negative lead is coupled to negative electrode 5 by an extension lead 11/5L "connected to one of the surfaces of the exposed portion 12" of current collector 10. EX1005, ¶¶[0039], [0093]; EX1003, ¶¶127-129, 178.

Pet. at 29-30.

Sato describes 11 *separate* embodiments, referring to each as Battery 1, Battery 2, and Battery 3 through Battery 11. Ex. 1005 ¶¶ [0104], [0111], [0136]-[0137], [0148]; Ex. 2015 ¶ 86. These embodiments fall into one of two categories of battery configurations. Ex. 2015 ¶ 86. In the first, describing Batteries 1 through 7 (*id.* ¶ [0101]),⁶ Sato discloses an electrode where the *negative* lead is at the electrode's *end* and the *positive* lead is within the *middle* of the positive electrode. *Id.* ¶¶ [0104], [0111] (describing negative lead on exposed "*outermost portion*").

In Batteries 8 through 11, the *negative* lead is in the *middle* of the negative electrode (*id.* ¶¶ [0107], [0136]-[0137]), while *positive* lead is at the *end* of the positive electrode. *Id.* ¶ [0137] (describing the exposed portion where the positive

⁶ Batteries 2 through 7 have the same location of the exposed portion as Battery 1, which is described in paragraphs [0104] and [0111]. *Id.* ¶ [0115] (Battery 2), ¶ [0117] (Battery 3), ¶ [0119] (Battery 4); ¶ [0121] (Battery 5); ¶ [0123] (Battery 6); ¶ [0125] (Battery 7).

lead was located as the “*at the innermost portion.*”); Ex. 2015 ¶ 87. This lead location applies to Battery 9, Battery 10 and Battery 11. Ex. 1005 ¶¶ [0139], [0141], [0143]. However, Petitioner purports to rely on Sato’s Battery 1 to teach the location of a “first recess” (positive recess in the middle) and Battery 8 to teach the location of the “second recess” (negative recess in the middle). Pet., 26-27 (citing disclosures for Battery 1 for the first recess), 29 (citing disclosures for Battery 8 for the second recess).

Petitioner’s expert, Dr. von Sacken, acknowledges that the proposed combination relies on *different embodiments* of Sato. Ex. 1003 ¶ [0136] (Dr. von Sacken stating “the following annotated figures show Sato’s positive electrode plate *according to Battery 1* and negative electrode plate *according to Battery 8*”); *see also id.* ¶ [0136], n. 5 (Dr. von Sacken stating “Sato’s Battery 8 includes a positive electrode and negative electrode made in the same manner as described in Battery 1 except for the placement of the tabs”). Accordingly, Sato fails to describe a single embodiment with a positive electrode active material layer provided with a “first recess” and a negative electrode active material layer provided with a “second recess” as claimed.

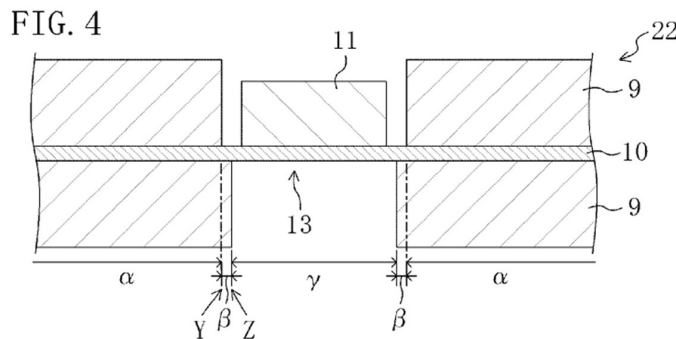
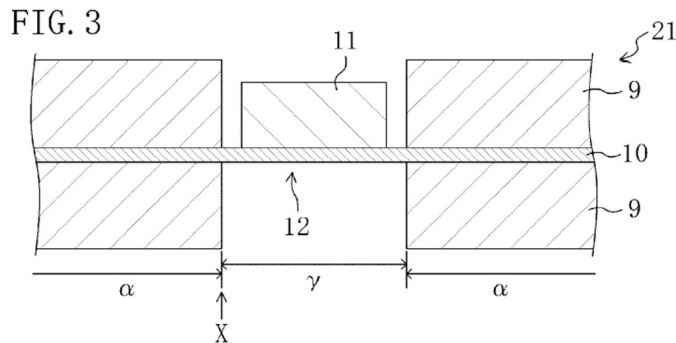
What’s more, even after admitting the presence of different embodiments, Dr. von Sacken merely provides the conclusory statement that a “POSA combining Battery 1 and Battery 8 would understand that this arrangement [of a lead in a recess]

is suitable for both positive and negative electrodes and that combining them would reduce the ‘current collection resistance.’” Ex. 1003 ¶ 102; Ex. 2015 ¶ 89. Thus, Petitioner’s case turns on this lone conclusory statement by Dr. von Sacken, which lacks any underlying support, evidence, or analysis to support the claimed assertion. Failure to provide a motivation to combine the disparate embodiments is fatal. *In re Stepan*, 868 F.3d 1342, 1345–46 n.1 (Fed. Cir. 2017) (When “combining multiple embodiments from a single reference, or selecting from large lists of elements in a single reference, there must be a motivation to make the combination and a reasonable expectation that such a combination would be successful, otherwise a skilled artisan would not arrive at the claimed combination.”).

In contrast, A POSITA would not be motivated by “current collection resistance” because (1) it would frustrate Sato’s primary purpose of passing a crush test (2) Sato nowhere seeks to improve current collection resistance and (3) current collection resistance is generally a battery trait that is secondary to ionic resistance and energy density. Ex. 2015 ¶ 89. As such, Petitioner’s unsupported theory fails for the following several reasons.

First, a POSITA would not have modified Sato at least because it would frustrate Sato’s primary purpose: to survive a crush test. Ex. 2015 ¶ 90. Sato improves the likelihood of passing a crush test by increasing the durability of an electrode at one of its weakest points—the middle. Specifically, Sato teaches the

specific “problem” of this prior art is that “the presence of the lead in the middle portion [of the electrode] tends to cause a stress.” Ex. 1003 ¶ [0024]. The stress identified by Sato becomes especially problematic if a recess is formed on both sides (i.e., top and bottom) of the active material. *See, id.*; Ex. 2015 ¶ 90. Unlike the ’498 Patent, Sato’s solution is to improve the structural integrity around the recesses by sizing a recess on top of the electrode with different dimensions than the recess on the bottom of the electrode, such that the edges of the top recess does not align with the edges of the bottom recess. Ex. 1003 ¶ [0015]; Ex. 2015 ¶ 90. As can be seen below, in the comparative example (Figure 3), the edges of the top and bottom recess of an electrode align. Ex. 1003, FIG. 3, ¶ [0038]-[0039]; Ex. 2015 ¶ 90. In Sato’s solution—as shown in Figure 4—the edges do not align, due to the relatively larger width of the top recess compared to the width “ γ ” of the bottom recess. *Id.*, FIG. 4, ¶ [0040].



Id., FIGS. 3, 4.

Modifying Sato to include a recess on each electrode would reduce the likelihood to pass a crush-test. Ex. 2015 ¶ 91. Sato teaches the specific “problem” of prior art is that “the presence of the lead *in the middle portion* [of the electrode] *tends to cause a stress.*” Ex. 1003 ¶ [0024]. Sato’s goal is to *reduce this stress* such that the battery will survive a crush test. Ex. 1003 ¶¶ [0008], [0009], [0022]-[0025]; [0042]; Ex. 2015 ¶ 91. Sato’s solutions, which all have only one lead in the middle portion, overcome the stated problem by minimizing stress. *Id.* If Sato added an additional lead in the middle, as Petitioner contends they would do, the additional recess would “tend[] to cause [additional] stress.” Ex. 1003 ¶ [0024]; Ex. 2015 ¶ 91.

Therefore, adding an additional recess to accommodate the presence of the lead in the middle portion would be nonobvious to a POSITA, counter to Sato's acknowledgement that leads in the middle of an electrode increase stress, counter to Sato's goal of reducing stress, and counter to Sato's embodiments which all use one recess. Ex. 2015 ¶ 91.

Second, Sato nowhere seeks to reduce "current collection resistance." Ex. 2015 ¶ 92. Sato teaches that the *prior art* has improved current collection by using a recess, but doing so comes with the problem of increased stress and failure of a crush test. Ex. 1005 ¶ [0024] (describing that, in Patent Document 2, "when an external force is applied, the presence of the lead in the middle portion tends to cause a stress . . ." but "[t]his problem, however, is not pointed out in Patent Document 2"). This is the very problem Sato intends to solve, but its proposed solution and advantages would be wholly defeated by Petitioner's proposed modification. Ex. 1003 ¶¶ [0008], [0009], [0022]-[0025], [0042]. Therefore, even assuming a POSITA wanted to improve current collection resistance beyond the prior art, Petitioner fails to explain why doing so would be worth the expense of sacrificing structural integrity in complete disregard for Sato's primary purpose and advantage. Ex. 2015 ¶ 92.

Third, current collection resistance is not even a critical problem in most Li-ion cells because "ionic resistance" far dominates over current collection resistance

in cells. Ex. 2015 ¶ 93. Therefore, a POSITA would generally not be motivated to improve current collection resistance, because such improvements would be minimal compared to the more difficult problem of ionic resistance. Ex. 2015 ¶ 93.

In sum, Sato does not disclose a battery with “a positive active material layer being provided with a first recess” and a “negative electrode active material layer being provided with a second recess,” and Petitioner does not provide a reasonable explanation for combining one recess from one embodiment with another recess from another embodiment. Ex. 2015 ¶ 94. Furthermore, a POSITA would not be motivated to combine portions of the different embodiments in Sato in the way Petitioner contends due to Sato’s goal of passing a crush test and limiting stress caused near the leads. *Id.* Including two recesses in both the middle of the positive electrode and the middle of the negative electrode would thus defeat the stated purpose and frustrate the alleged improvement of Sato. *Id.*

2. Claim 17 is Not Unpatentable

For Claim 17, Petitioner relies on the same arguments discussed above for Claim 1. Pet. § IX. B.1 (addressing Claims 1 and 17 together, starting on page 23). Therefore, for at least the same reasons discussed above for Claim 1 (Section VI.A.1), Petitioner fails to show Sato and Takemura render obvious Claim 17. Ex. 2015 ¶ 95.

3. Claims 2-3, 6, 8, and 19 Are Not Unpatentable

Claims 2–3, 6, and 8 are not unpatentable for at least the same reasons as discussed above with respect to claim 1 and at least because they depend from claim 1. Ex. 2015 ¶ 96. Claim 19 is not unpatentable for at least the same reasons as discussed above with respect to claim 17 and at least because it depends from claim 17. Ex. 2015 ¶ 96. Patent Owner reserves the right to address claims 2–3, 6, 8, and 19 individually if this proceeding is instituted.

B. Ground 2: Sato, Takemura, and Nakamura Do Not Render Obvious Claims 4, 5, 7, and 18

Petitioner fails to establish that there is a reasonable likelihood that at least one challenged claim of Ground 2 is unpatentable. Ex. 2015 ¶ 97. Claims 4, 5, and 7 depend from Claim 1 and Claim 18 depends from Claim 17. Petitioner relies on its Ground 1 arguments for the elements recited by independent Claims 1 and 17. Ex. 2015 ¶ 97. Therefore, Claims 4, 5, 7, and 18 are not unpatentable for at least the same reasons as discussed above with respect to Ground 1.

C. Ground 3: Sato, Takemura, Oh-539, and Oh-144 Do Not Render Obvious Claims 20 and 22

Petitioner fails to establish that there is a reasonable likelihood that at least one challenged claim of Ground 3 is unpatentable. Ex. 2015 ¶ 98. Claim 20 depends from claim 1 and claim 22 depends from Claim 17. Petitioner relies on its Ground 1 arguments for the elements recited by independent Claims 1 and 17. Ex. 2015 ¶ 98.

Therefore, claims 20 and 22 are not unpatentable for at least the same reasons as discussed above with respect to Ground 1.

D. Ground 4: Sato, Takemura, and Kobayashi Do Not Render Obvious Claims 9-11, 14, and 16

Petitioner fails to establish that there is a reasonable likelihood that at least one challenged claim of Ground 4 is unpatentable. Ex. 2015 ¶ 99. For claim 9, Petitioner relies wholly on its Claim 1/Ground 1 analysis for all the similar elements appearing in Claim 9, which make up a majority of the claim language. Pet., 68-69; *see also* Pet., 114-116. Therefore, Ground 4 fails for all the same reasons identified for Ground 1 with respect to claim 1 *Supra*, Section VI.A.1; Ex. 2015 ¶ 99.

Claims 10, 11, 14, and 16 depend from claim 9. Petitioner relies on its Ground 4 arguments for the elements recited by independent claim 9. Pet., 68-69; *see also* Pet., 114-116. Therefore claims 10, 11, 14, and 16 are not unpatentable for at least the same reasons as discussed above with respect to Ground 1. Ex. 2015 ¶ 100.

E. Ground 5: Sato, Takemura, Kobayashi, and Nakamura Do Not Render Obvious Claims 12, 13, and 15

Petitioner fails to establish that there is a reasonable likelihood that at least one challenged claim of Ground 5 is unpatentable. Claims 12, 13, and 15 depend from claim 9. Petitioner relies on its Ground 4 arguments for the elements recited by independent claim 9. Therefore, claims 12, 13, and 15 are not unpatentable for at least the same reasons as discussed above with respect to Ground 4. Ex. 2015 ¶ 101.

F. Ground 6: Sato, Takemura, Kobayashi, Oh-539, and Oh-144 Do Not Render Obvious Claim 21

Petitioner fails to establish that there is a reasonable likelihood that at least one challenged claim of Ground 6 is unpatentable. Claim 21 depends from claim 9. Petitioner relies on its Ground 4 arguments for the elements recited by independent claim 9. Therefore, claim 21 is not unpatentable for at least the same reasons as discussed above with respect to Ground 4. Ex. 2015 ¶ 102.

G. Ground 7: Takemura, Oh-539, and Kobayashi Do Not Render Obvious Claims 1-3, 9-11, and 17

Petitioner contends that Takemura, Oh-539, and Kobayashi render obvious claims 1-3, 9-11, and 17 of the '498 Patent. Petitioner fails to establish that there is a reasonable likelihood that at least one challenged claim of Ground 7 is unpatentable, for the reasons below. Ex. 2015 ¶¶ 103-104.

1. The Petition Fails to Show That Takemura, Oh-539, and Kobayashi Render Obvious Claim 1

a. Takemura Teaches Away from the Arrangement of Tape in FIGS. 8 and 9

As discussed above with respect to Ground 1, Takemura instructs a POSITA *not* to expand the tape of FIGS. 8 and 9—the very opposite of what Petitioner claims a POSITA would be motivated to do. *Supra* § VI.A.1.a; Ex. 2015 ¶ 105.

Petitioner relies on Takemura as a primary reference allegedly teaching claim elements such as a “battery,” a “positive electrode,” a “negative electrode,” and a

“separator.” Pet. 88 -89, 91-92, 95-96. Petitioner relies on Oh-549 to disclose a first recess (Pet. at 90-91) and a second recess (Pet. 93-95). Like Grounds 1 and 4, Petitioner relies wholly on Takemura’s Figures 8 and 9 tape to disclose tape with a width and length greater than a width and length of the second recess. Pet. 102-103. For the same reasons as discussed above in Grounds 1 and 4, its combination with Oh-549 fails. Ex. 2015 ¶ 106.

Petitioner argues a POSITA would be motivated to use “the width of Takemura’s insulating tape” which it argues is “greater than the width of the recess formed in the negative active material of Takemura’s negative electrode to cover all exposed metal.” Pet. 103, Ex. 1003 ¶¶ 397-398, 432-434, 460-462. Petitioner further asserts that “a POSA would have made the length of Takemura’s tape (measured along the electrode’s width) larger than the length of the current collector’s exposed surface in the Takemura-Oh-539 battery to avoid exposing negative electrode metal to lithium plating (or, at least, found this obvious).” Pet. 103, Ex. 1003 ¶ 398.

But this alleged motivation is undercut by Takemura itself for the same reasons discussed above with regard to Grounds 1 and 4. Takemura disparages the use of tape in Figures 8 and 9, seeking to solve the problems that tape causes by *eliminating or minimizing* the tape. *Supra*, § VI.A.1.a. A POSITA would therefore not have made the length of Takemura’s tape *larger* as is asserted by Petitioner.

Moreover, and unlike the claims of the '498 Patent, Oh-539 has nothing to do with preventing lithium deposition or using tape—it never mentions either. Ex. 2015 ¶ 108. Oh-539 identifies a problem with the prior art, namely, that a “conventional lithium secondary battery is problematic in that its high-rate discharging characteristics are not good because the distance the electric current moves is long.” Ex. 1007¶ [0006]. To solve this high discharging rate problem, Oh-539 discloses “decreasing the distance the electric current moves” in a battery. *Id.* ¶ [0007]. Oh-539 achieves this decreased distance by forming non-coated portions such that “tab 32 is connected of the cathode center non-coated portion.” *Id.* [0047]- [0048]; *see also id.* ¶¶ [0058]-[0060] (discussing center non-coated portions for the anode). Therefore, the current no longer has to travel from one end of the electrode to the other. *Id.*

As Dr. Kaschmitter explains, a POSITA would not be motivated to combine Takemura’s disparaged tape size from Figs. 8 and 9 with Oh-539. Ex. 2015 ¶¶ 108-09. The motivation cannot be found in Oh-539—especially not a motivation that overcome the disparagement in Takemura—because Oh-539 never mentions lithium deposition/plating or tape. *See, generally*, Ex. 1007. Therefore, a POSITA would not be motivated to combine Takemura’s Figure 8 and 9 tape with Oh-539.

b. Takemura does not render obvious a “second insulating glue layer” that “has a length larger than a length of the second recess”

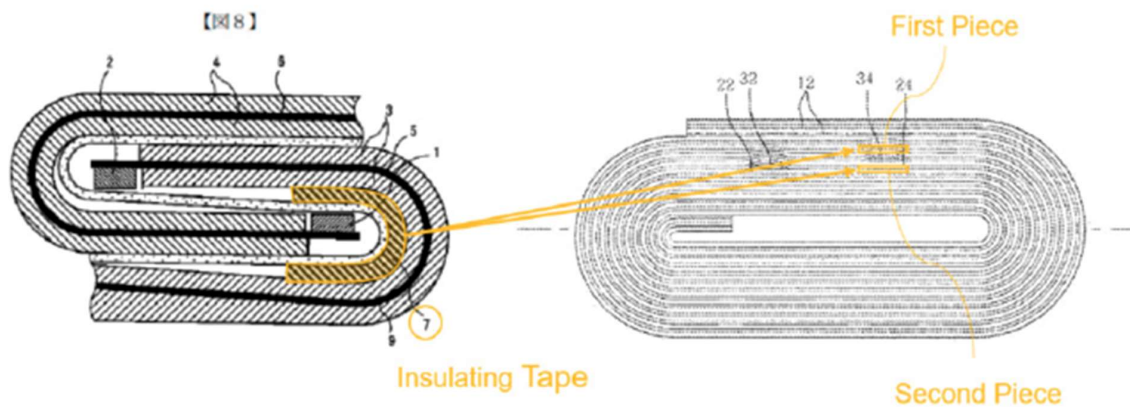
Takemura does not render obvious “a second insulating glue layer” that “has a length larger than a length of the second recess.” Ex. 2015 ¶ 110. Petitioner relies entirely on Takemura to disclose this claim element. Pet., 102-103. But as explained in Section VI.A.1.b (and as Petitioner admits), Takemura fails to disclose a second insulating glue layer having “a length larger than a length of the second recess.” Therefore, Ground 7 fails for the same reasons as identified for Grounds 1 and 4. Ex. 2015 ¶ 110.

c. Even if combined, the resulting combination of Takemura with Oh-539 would not result in placing the “second insulating glue layer” at the claimed location

Combining Takemura and Oh-539 would not result in a “second insulating glue layer” placed “opposite to the second recess.” Ex. 2015 ¶ 111.

Petitioner argues a POSITA would be motivated to combine Takemura and Oh-539 and “shift[] Takemura’s [Figure 8 and 9] tape on the surface of positive active material layer to remain opposite the negative lead connection to shield the exposed metal surfaces of the negative lead connection from lithium plating.” Pet. 99-100, Ex. 1003 ¶ 394. Petitioner argues “[s]pecifically, a POSA would have placed Takemura’s tape on the positive material layer surface opposite the second recess of Takemura-Oh-539 battery.” Pet. 100; Ex. 1003 ¶ 394. When combining Takemura’s

tape with Oh-539's central lead placement, Petitioner asserts a POSITA would place the tape in the central portions of the electrodes (as shown on the right-hand side in Petitioner's annotated figures below). Pet., 99-100; Ex. 1003 ¶ 395.



Petitioner and Dr. von Sacken assert that “In combining Oh-539's central placement of the negative lead connection with Takemura, a POSA would have likewise shifted Takemura's tape on the surface of positive active material layer to remain opposite the negative lead connection *to shield the exposed metal surfaces of the negative lead connection from lithium plating.*” Pet., 99-100; Ex. 1003 ¶ 394-95. Dr. von Sacken further asserts that:

To prevent lithium plating at the exposed metal located on the top and bottom side of the second recess in the Takemura-Oh-539 battery, a POSA would have been motivated to divide Takemura's insulating tape 7, which is bent around top and bottom sides at an end of the electrode, into two pieces as shown above. The two pieces would be located at the second location as recited in element [1.H] of the '498 patent—namely

on a surface of the positive electrode active material layer across the separator from the second recess, with the first piece above and the second piece below the second recess.

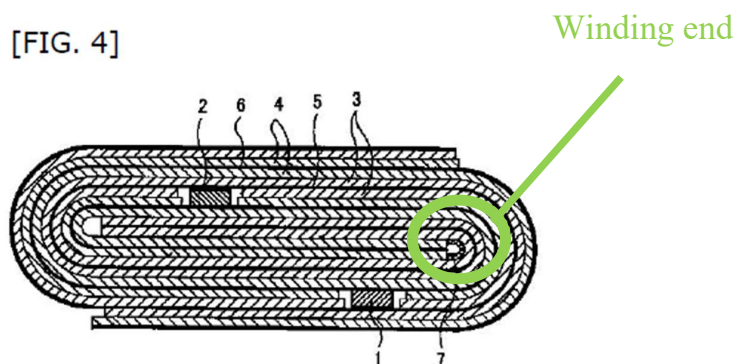
Ex. 1003 ¶ 395.

But as explained by Dr. Kaschmitter, a POSITA would not have combined Takemura's lithium plating prevention with Oh-539's lead placement. Ex. 2015 ¶ 114. Even assuming that a POSITA would have combined Takemura's lithium plating prevention with Oh-539's lead placement, which would be incorrect (*id.* ¶ 114), the combination would not be accomplished in the way proposed by Petitioner. Ex. 2015 ¶ 114. If using Takemura's teachings for how to avoid lithium plating, a POSITA would instead shave off the active material as taught by Takemura such that no tape is needed around Oh-539's leads—which would not meet the claim limitations. Ex. 2015 ¶ 114; Ex. 1006 ¶ [0019]. Takemura teaches removing active material to form “an active material uncoated portion . . . which prevents lithium metal deposition.” *Id.*

In fact, Petitioner's hypothetical combination of Takemura's tape with the central recesses of Sato is contradicted by Takemura's actual teaching for how a minimal amount of tape should be placed in a battery with centrally located recess. Ex. 2015 ¶ 115. In Figure 4—the only Takemura disclosure that has a lead in a recess (and not a disclosure that Petitioner relied upon)—Takemura teaches placing a

minimal amount of tape only at *the winding end* to prevent lithium deposition. *Id.*

¶ [0022] (“The positive electrode active material layer 3 opposite the beginning of the winding end of the negative electrode is covered with insulating tape 7 to prevent lithium metal deposition”). Minimal insulating tape 7 can be seen at the winding end of the electrode in Figure 4 below.



Ex. 1007, FIG. 4; Ex. 2015 ¶ 115. Therefore, adding tape where Petitioner alleges—in the middle of Sato— would cause additional “extra space” at the locations of Oh-539, something which Takemura teaches a POSITA to avoid. Ex. 1006 ¶ [0035]; Ex. 2015 ¶¶ 115-16. In other words, had Takemura actually contemplated disclosing the use of tape across recesses (and beyond), it had ample opportunity to do so. *Id.* Instead, it disclosed an *alternative* to placing tape “opposite” a recess. *Id.* And given Oh-539 is silent on the use of tape, neither Takemura nor Oh-539 can be relied upon to come up with the proposed “modified” version of Takemura. Ex. 2015 ¶ 116.

2. Claims 9 and 17 are Not Unpatentable

For Claim 9 and 17, Petitioner relies on the same arguments discussed above for Claim 1. Pet. § XV.C (addressing Claims 1, 9, and 17 together on pages 88-100). Therefore, for at least the same reasons discussed above for Claim 1 (Section VI.G.1), the Petition fails to show Takemura, Oh-539, and Kobayashi render obvious Claim 17. Ex. 2015 ¶ 117.

3. Claims 2, 3, 10, and 11 are Not Unpatentable

Claims 2 and 3 are not unpatentable for at least the same reasons as discussed above with respect to claim 1 and at least because they depend from claim 1. Ex. 2015 ¶ 118. Claims 10 and 11 are not unpatentable for at least the same reasons as discussed above with respect to claim 9 and at least because they depend from claim 9. *Id.* Patent Owner reserves the right to address claims 2, 3, 10, and 11 individually if this proceeding is instituted.

H. Ground 8: Takemura, Oh-539, and Oh-144 Do Not Render Obvious Claims 20-22

Petitioner fails to establish that there is a reasonable likelihood that at least one challenged claim of Ground 8 is unpatentable. Ex. 2015 ¶ 119. Claim 20 depends from claim 1, claim 21 depends from claim 9, and claim 22 depends from claim 17. Petitioner relies on its Ground 1 arguments for the elements recited by independent Claims 1 and 17. Therefore, claims 20 and 22 are not unpatentable for at least the same reasons as discussed above with respect to Ground 1. Ex. 2015 ¶ 119.

Petitioner relies on its Ground 4 arguments for the elements recited by independent Claims 9. Therefore, claim 21 is not unpatentable for at least the same reasons as discussed above with respect to Ground 4. Ex. 2015 ¶¶119.

I. Petitioner’s Multiple Different Flawed Grounds Merit Denial

Given the number of grounds lack merit, it would not be an efficient use of resources for the Board to institute. *See, e.g., Chevron Oronite Co. v. Infieum USA LP*, IPR2018-00923, Paper 9, 9-11 (P.T.A.B. Nov. 7, 2018) (informative).

VII. CONCLUSION

Patent Owner respectfully submits that the Board should deny institution of all Grounds of the Petition.

Dated: June 10, 2025

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 9,932 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: June 10, 2025

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 and NINGDE AMPEREX TECH. EXHIBITS 2015-2017** were served in their entirety on June 10, 2025 by filing these documents through the PTAB's P-TACTS Filing System as well as delivering true and correct copies by electronic mail on Petitioner's lead and backup counsel at the following email addresses (as agreed by counsel for Petitioner):

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