

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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TOKYO OHKA KOGYO., LTD.,  
Petitioner,

v.

FUJIFILM ELECTRONIC MATERIALS U.S.A., INC.,  
Patent Owner.

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PGR2022-00010  
Patent 10,927,329 B2

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Before JO-ANNE M. KOKOSKI, JON B. TORNQUIST, and  
JEFFREY W. ABRAHAM, *Administrative Patent Judges*.

KOKOSKI, *Administrative Patent Judge*.

JUDGMENT  
Final Written Decision  
Determining All Challenged Claims Unpatentable  
*35 U.S.C. § 328(a)*

## I. INTRODUCTION

We have jurisdiction to conduct this post-grant review under 35 U.S.C. § 6, and issue this Final Written Decision pursuant to 35 U.S.C. § 328(a). For the reasons that follow, we determine that Tokyo Ohka Kogyo Co., Ltd.<sup>1</sup> (“Petitioner”) has shown by a preponderance of the evidence that claims 1–15 (“the challenged claims”) of U.S. Patent No. 10,927,329 B2 (“the ’329 patent,” Ex. 1001) are unpatentable.

### *A. Procedural Background*

Petitioner filed a Petition requesting post-grant review of claims 1–15 of the ’329 patent. Paper 2 (“Pet.”). FUJIFILM Electronic Materials U.S.A., Inc.<sup>2</sup> (“Patent Owner”) filed a Preliminary Response. Paper 6. With Board authorization, Petitioner filed a Preliminary Reply (Paper 7) and Patent Owner filed a Preliminary Sur-reply (Paper 8). Pursuant to 35 U.S.C. § 324(a), we instituted a post-grant review of claims 1–15 on the grounds advanced in the Petition. Paper 9, 4, 19.

After institution of trial, Patent Owner filed a Patent Owner Response (“PO Resp.,” Paper 15), Petitioner filed a Reply (“Pet. Reply,” Paper 19), and Patent Owner filed a Sur-reply (“PO Sur-reply,” Paper 21). We held an oral hearing on March 8, 2023, and a transcript is included in the record. Paper 27.

### *B. Related Matters*

Petitioner states that it “is not aware of any judicial proceedings that would affect or be affected by this proceeding,” and identifies several patents and patent applications that it asserts are related to the ’329 patent.

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<sup>1</sup> Petitioner identifies itself as the real party-in-interest. Pet. 83.

<sup>2</sup> Patent Owner identifies itself as the real part-in-interest. Paper 4, 2.

Pet. 84. Patent Owner identifies two patents and a patent application that it asserts claim priority to the '329 patent. Paper 4, 2.

*C. The '329 Patent*

The '329 patent, titled “Cleaning Formulations for Removing Residues on Surfaces,” relates to a cleaning composition for semiconductor substrates, and particularly to a cleaning composition for removing residues such as plasma etch and plasma ash formed on semiconductor substrates. Ex. 1001, code (54), 1:21–29. The disclosed compositions include, in various concentrations, “at least one redox agent” (*id.* at 3:47–50), “at least one first chelating agent” (*id.* at 3:62–64), “at least one metal corrosion inhibitor,” (*id.* at 10:24–25), “at least one organic solvent” (*id.* at 10:66–11:2), and water (*id.* at 12:3–4). The compositions “may contain” or “specifically exclude” one or more additives. *Id.* at 15:9–22. The additive may be a pH adjusting agent present in amounts of “at least about 0.1% by weight (e.g., at least about 0.5% by weight, at least about 1% by weight, or at least about 1.5% by weight) and/or at most about 3% by weight (e.g., at most about 2.5% by weight, at most about 2% by weight, or at most about 1.5% by weight).” *Id.* at 12:36–43. The pH adjusting agent may be an alkanolamine. *Id.* at 12:45–49.

The '329 patent states that the cleaning composition is “generally non-corrosive to exposed substrate materials (e.g., exposed metals such as aluminum, aluminum/copper alloy, copper, titanium, tantalum, tungsten, cobalt, and metal nitrides such as titanium and tungsten nitrides)” and that “it can clean a broad range of residues.” Ex. 1001, 2:28–33.

*D. Illustrative Claim*

Petitioner challenges claims 1–15 of the '329 patent. Claim 1, the only independent claim, is illustrative of the challenged claims and is reproduced below:

1. A cleaning composition, comprising:

- 1) hydroxylamine;
- 2) an alkanolamine in an amount of at most about 3% by weight of the composition;
- 3) an alkylene glycol; and
- 4) water

wherein the pH of the composition is from about 7 to about 11.

Ex. 1001, 29:1–9.

*E. Evidence*

Petitioner relies on the evidence listed below (Pet. 13–14):

<b>Reference</b>	<b>Date</b>	<b>Exhibit No.</b>
US 2013/0061882 A1 (“Wu”)	March 14, 2013	1008
US 2007/0060490 A1 (“Skee”)	March 15, 2007	1012

Petitioner also relies on the Declaration of Alexander Glew, Ph.D.

(Ex. 1007). Patent Owner relies on the Second Declaration of Reinhold H.

Dauskardt (Ex. 2009).

*F. Asserted Grounds*

Petitioner asserts that claims 1–15 would have been unpatentable on the following grounds:

<b>Claim(s) Challenged</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>
1–15	112(a)	Lack of Written Description Support
1–15	103 <sup>3</sup>	Wu
1–15	103	Wu, Skee

Pet. 13.

II. ANALYSIS

*A. Level of Ordinary Skill in the Art*

Petitioner contends that a person having ordinary skill in the art (“POSA”) “would have had a Bachelor degree in materials science, engineering, chemistry or similar technical discipline, and had at least two years of experience relating to the design and development of semiconductor manufacturing processes.” Pet. 14. Petitioner further submits that, “[a]lternatively, such a person may have had additional graduate education as a substitute for professional experience, or significant work experience as a substitute for formal education.” *Id.* Patent Owner states that, “[w]ithout taking a position on the correctness of this definition, Patent Owner applies Petitioner’s POSA definition.” PO Resp. 11 (citing Pet. 14).

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<sup>3</sup> The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), revised 35 U.S.C. § 103 effective March 16, 2013. Petitioner contends, and Patent Owner does not contest, that “the earliest priority date claimed by the ’329 patent” is December 6, 2013. Pet. 13; PO Resp. 6. Because the undisputed earliest claimed priority date of the ’329 patent is after March 16, 2013, we apply the AIA versions of §§ 102 and 103.

We adopt Petitioner’s proposed definition, which is undisputed on this record, and is consistent with the level of skill in the art at the time of the invention as reflected in the prior art in this proceeding.

*B. Claim Construction*

We construe each claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b). Under this standard, claim terms are generally given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). Only those terms in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

Based on our review of the complete record and the arguments raised by the parties, we determine it is necessary to expressly construe the term “cleaning composition” recited in claim 1 in order to resolve the controversy between the parties.

The parties agree that the recited “cleaning composition” is a composition for removing residues from substrates. PO Resp. 12 (proposing that “cleaning composition” be construed to mean “a composition for removing residues from a semiconductor substrate, comprising at least a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water”); Pet. Reply 2 (“[T]he recited ‘cleaning composition’ should be accorded its plain and ordinary meaning,” “which is a ‘composition for removing residues from substrates.’”). The dispute centers

on Patent Owner’s requirement that the construction of “cleaning composition” additionally includes that it “compris[es] at least a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water.”

We begin our analysis with the language of the claims. *Phillips*, 415 F.3d at 1312; *see also SuperGuide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870, 874–874 (Fed. Cir. 2004) (“There is a ‘heavy presumption’ that the terms used in the claims ‘mean what they say and have the ordinary meaning that would be attributed to those words by persons skilled in the relevant art.’”). Claim 1 states that the “cleaning composition” comprises “hydroxylamine,” “an alkanolamine in an amount of at most about 3% by weight of the composition,” “an alkylene glycol,” and “water.” Ex. 1001, 29:2–7. The claim also recites that “the pH of the composition is from about 7 to about 11.” *Id.* at 29:8–9. A plain reading of the claim text reveals that the recited “cleaning composition” is a composition for cleaning that includes the recited components and has the recited pH. The claim is silent, however, as to the specific purpose of the cleaning composition.

We turn next to the specification. *Phillips*, 415 F.3d at 1315; *see also SuperGuide*, 358 F.3d at 875 (“We review the patent’s written description and drawings to confirm that the patentee’s use of the disputed term is consistent with the meaning given to it by the court.”); *see also Brown v. 3M*, 265 F.3d 1349, 1352 (Fed. Cir. 2001) (finding that the plain reading of the claim text is sufficient to construe terms that “are not technical terms of art” and, therefore, “do not require elaborate interpretation”). The ’329 patent consistently states that the disclosed cleaning composition is for removing residues formed on semiconductor substrates. *See, e.g.*, Ex. 1001, code (57) (stating that the cleaning composition is used “for cleaning a

semiconductor substrate”), 2:10–12 (“the cleaning solution should be effective for removing the plasma etch and plasma ash residues”), 15:52–55 (“[T]he cleaning compositions of the present disclosure are generally designed to remove all residues after bulk resist removal by dry or wet stripping methods.”). For example, the “Field of the Disclosure” section of the ’329 patent states that the disclosure is directed to a cleaning composition for semiconductor substrates:

The present disclosure relates to a novel cleaning composition for semiconductor substrates and a method of cleaning semiconductor substrates. More particularly, the present disclosure relates to a cleaning composition for removing plasma etch residues formed on semiconductor substrates after plasma etching of metal layers or dielectric material layers deposited on the substrates and the removal of residues left on the substrates after bulk resist removal via a plasma ashing process.

*Id.* at 1:23–29. The “Summary of the Disclosure” section similarly states:

The present disclosure is directed to a non-corrosive cleaning composition that is useful primarily for removing residues (e.g., plasma etch and/or plasma ashing residues) from a semiconductor substrate as an intermediate step in a multistep process. . . . An advantage of the cleaning composition described herein is that it can clean a broad range of residues encountered and be generally non-corrosive to exposed substrate materials (e.g., exposed metals such as aluminum, aluminum/copper alloy, copper, titanium, tantalum, tungsten, cobalt, and metal nitrides such as titanium and tungsten nitrides).

*Id.* at 2:17–33.

Read as a whole, the specification supports the conclusion that a “cleaning composition” as recited in claim 1 of the ’329 patent is “a composition for removing residues from semiconductor substrates.”



Patent Owner argues that “cleaning composition” should be construed to also include a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water. Patent Owner’s arguments in this regard are premised on the parties’ agreement that “[t]he ’329 patent’s disclosure is *unambiguously explicit regarding mandatory components of the cleaning compositions described therein.*” PO Resp. 15 (citing Pet. 17; Ex. 1007 ¶¶ 56–57) (alterations in original). Patent Owner asserts that it also “agrees with Petitioner that ‘[a] POSA would not have understood the inventors of the ’329 patent to have possessed ‘chelating agent-less’ and ‘corrosion inhibitor-less’ cleaning compositions.’” *Id.* (citing Pet. 17; Ex. 2009 ¶ 53) (alteration in original). Because “a POSA would have understood that the specification makes it abundantly clear that the claimed cleaning composition includes a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water” (*id.*), Patent Owner argues that “the claim must be given the meaning consistent with that understanding—the claimed ‘cleaning composition’ includes a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water” (PO Sur-reply 9).

We disagree. It is clear from the plain language of claim 1 that the claimed “cleaning composition” is a composition for cleaning that includes four named components and has a specified pH. Ex. 1001, 29:2–9. The ’329 patent specification unambiguously teaches that the cleaning composition is for removing residues from semiconductor substrates. *Id.* at 1:23–29, 2:10–12, 2:17–33, 15:52–55.

Although the ’329 patent describes a cleaning composition that comprises a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water, we see no reason to construe the term “cleaning composition” itself to require these components. Claim 1 expressly recites

the components that comprise the claimed “cleaning composition,” without expressly including or precluding a chelating agent or a metal corrosion inhibitor. Ex. 1001, 29:2–9. The Federal Circuit advises that the specification “is not a suitable substitute for, nor can it be used to rewrite, the chosen claim language. ‘Specifications teach. Claims claim.’”

*SuperGuide*, 358 F.3d at 875 (quoting *SRI Int’l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1121 n. 14 (Fed. Cir. 1985) (en banc)). The ’329 patent specification does teach a cleaning composition that includes a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water, but claim 1 is directed to a cleaning composition that expressly requires only a subset of those components. Patent Owner’s proposed construction would effectively rewrite the claim by adding unclaimed components, which we decline to do under the guise of claim construction. *See id.* (“Though understanding the claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim.”).

Patent Owner also argues that “a broad construction of the term ‘cleaning composition’ would ‘likely render the claims invalid for lack of written description’ and, as a result, “cleaning composition” should be construed to preserve the validity of claim 1. PO Resp. 20–21 (citing *Ruckus Wireless, Inc. v. Innovative Wireless Sols., LLC*, 824 F.3d 999, 1004 (Fed. Cir. 2016)). The Federal Circuit instructs, however, that “unless the court concludes, after applying all the available tools of claim construction, that the claim is still ambiguous, the axiom regarding the construction to preserve validity of the claim does not apply.” *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 911 (Fed. Cir. 2004); *see also Phillips*, 415 F.3d at 1327 (“While we have acknowledged the maxim that claims should be

construed to preserve their validity, we have not applied that principle broadly, and we have certainly not endorsed a regime in which validity analysis is a regular component of claim construction.”). Because we conclude that the intrinsic record is unambiguous, and reach a determination based on that unambiguous record, we do not need to resort to this validity canon in order to construe the challenged claims.

Accordingly, we find that the intrinsic evidence is unambiguous and decline to adopt Patent Owner’s construction and the additional limitation that the “cleaning composition” comprises a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water. PO Resp. 12. We construe “cleaning composition” to mean “a composition that removes residues from semiconductor substrates.”

*C. Alleged Lack of Written Description Support*

To satisfy the written description requirement under 35 U.S.C. § 112(a), the specification must “reasonably convey[] to those skilled in the art that the inventor had possession” of the claimed invention as of the filing date. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). An adequate description does not require any particular form of disclosure or that the specification recite the claimed invention *in haec verba*, but must do more than render the claimed invention obvious. *Id.* at 1352. In evaluating the adequacy of the disclosure, a court may consider “the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, [and] the predictability of the aspect at issue.” *Capon v. Eshhar*, 418 F.3d 1349, 1359 (Fed. Cir. 2005) (cited with approval in *Ariad*, 598 F.3d at 1352); *see also Boston Sci. Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1366 (Fed. Cir. 2011) (holding that because the assessment for written description is made

from the perspective of a POSA, in some instances, a patentee can rely on information that is “well-known in the art” to satisfy written description).

Petitioner argues that the ’329 patent specification does not provide adequate written description support for the challenged claims. Pet. 15–43. Specifically, Petitioner argues that the ’329 patent describes cleaning compositions that contain at least one redox agent, at least one first chelating agent, at least one metal corrosion inhibitor, at least one organic solvent, and water “as mandatory components.” *Id.* at 18 (citing Ex. 1007 ¶ 71). Petitioner then argues that the ’329 patent does not disclose “any composition that omits these mandatory components—particularly the ‘first chelating agent’ and the ‘metal corrosion inhibitor.’” *Id.* Petitioner also argues that, because claim 1 recites a cleaning composition that does not include a first chelating agent or a metal corrosion inhibitor, “[a] POSA would not have understood the inventors of the ’329 patent to have possessed ‘chelating agent-less’ and ‘corrosion inhibitor-less’ cleaning compositions.” *Id.* at 17.

Patent Owner responds that “a POSA would have understood that the purportedly ‘essential’ features are not absent from the claims.” PO Resp. 23. Specifically, Patent Owner contends that the claims are open-ended and thus do not preclude a chelating agent or corrosion inhibitor. *Id.* Patent Owner also contends that “a POSA would have been informed by the specification about other necessary components in the inventive compositions to achieve the intended purpose of the invention.” *Id.* at 24 (citing Ex. 2009 ¶ 73). Patent Owner also asserts that it “has never intended to claim ‘chelating agent-less’ and ‘corrosion inhibitor-less’ cleaning compositions.” *Id.*

Based on our review of the full record now before us, we determine that Petitioner establishes that the '329 patent does not provide sufficient written description support for the challenged claims. Pet. 15–43; Ex. 1007 ¶¶ 56–82. More specifically, we find that the '329 patent does not reasonably convey to a POSA that the inventor was in possession of cleaning compositions that do not include a chelating agent or a metal corrosion inhibitor.

There is no dispute, on this record, that the '329 patent specification explicitly teaches that a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water are mandatory components of the cleaning composition described therein. PO Resp. 15 (Patent Owner agreeing with Petitioner that “[t]he '329 patent’s disclosure is unambiguously explicit regarding mandatory components of the cleaning compositions described therein.” (citing Pet. 17; Ex. 1007 ¶¶ 56–57) (emphasis omitted, alteration in original)); *see* Ex. 1001, 3:47–48, 3:62–64, 10:24–26, 10:66–11:2, 12:3–4; Ex. 1007 ¶¶ 56–67. Claim 1, however, does not require that the cleaning composition include a chelating agent or a metal corrosion inhibitor. Ex. 1001, 29:2–9. Therefore, establishing proper written description support for claim 1 requires more than showing that the inventor was in possession of a cleaning composition that includes a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water; the '329 patent must also show that the inventor was in possession of a cleaning composition that includes only a redox agent (hydroxylamine), an organic solvent (an alkylene glycol), water, and an alkanolamine. *Id.*

Patent Owner’s arguments that the challenged claims are sufficiently supported by the '329 patent’s disclosure are premised on its proposed claim construction which, as set forth above, we decline to adopt. Patent Owner

does not address whether the challenged claims are sufficiently supported by the '329 patent using any other construction of "cleaning composition."

By agreeing with Petitioner that "[a] POSA would not have understood the inventors of the '329 patent to have possessed 'chelating agent-less' and 'corrosion inhibitor-less' cleaning compositions," Patent Owner concedes that the challenged claims lack adequate written description support. PO Resp. 15 (citing Pet. 17; Ex. 2009 ¶ 53) (alteration in original). Patent Owner also recognizes that "a broad construction of the term 'cleaning composition'" that does not include a redox agent, a chelating agent, a metal corrosion inhibitor, an organic solvent, and water "would 'likely render the claims invalid for lack of written description.'" *Id.* at 20–21.

For these reasons, we determine that Petitioner shows, by a preponderance of the evidence, that independent claim 1, and claims 2–15 that directly depend therefrom, lack written description support in the '329 patent.

*D. Alleged Obviousness over Wu or Wu and Skee*

Petitioner contends that claims 1–15 would have been obvious over the teachings of Wu, or the combined teachings of Wu and Skee. Pet. 43–81. Because we determine that Petitioner has established by a preponderance of the evidence claims 1–15 lack written description support in the '329 patent, we decline to address these grounds.

### III. CONCLUSION<sup>4</sup>

After reviewing the record and weighing the evidence offered by both parties, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–15 are unpatentable because they lack sufficient written description support in the '329 patent.

In summary:

<b>Claims</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Claims Shown Unpatentable</b>	<b>Claims Not shown Unpatentable</b>
1–15	112(a)	Lack of Written Description Support	1–15	
1–15	103	Wu <sup>5</sup>		
1–15	103	Wu, Skee <sup>6</sup>		
<b>Overall Outcome</b>			1–15	

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<sup>4</sup> Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

<sup>5</sup> As explained above, we do not reach this ground because Petitioner shows that the challenged claims are unpatentable because they lack sufficient written description support in the '329 patent.

<sup>6</sup> As explained above, we do not reach this ground because Petitioner shows that the challenged claims are unpatentable because they lack sufficient written description support in the '329 patent.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has shown by a preponderance of the evidence that claims 1–15 of the '329 patent are unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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