

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CHONGQING YANMEI TECHNOLOGY CO., LTD.,
Petitioner,

v.

TERVES, LLC,
Patent Owner.

IPR2023-00521
Patent 10,689,740 B2

Before JO-ANNE M. KOKOSKI, JON B. TORNQUIST, and
JANE E. INGLESE, *Administrative Patent Judges*.

TORNQUIST, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
Granting-in-Part and Denying-in-Part Patent Owner's
Contingent Motion to Amend
35 U.S.C. § 318(a)

I. INTRODUCTION

Chongqing Yanmei Technology Co., Ltd. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–81 of U.S. Patent No. 10,689,740 B2 (Ex. 1001, “the ’740 patent”). Terves, LLC (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 7.

On June 2, 2023, and prior to filing its Preliminary Response, Patent Owner disclaimed claims 1–18 and 62 of the ’740 patent. Ex. 2008; Ex. 2009. Thus, only claims 19–61 and 63–81 remain in this proceeding. 37 C.F.R. § 42.107(e) (“No *inter partes* review will be instituted based on disclaimed claims.”).

We instituted review of claims 19–61 and 63–81 on every ground of unpatentability set forth in the Petition. Paper 14 (“Inst. Dec.” or “Institution Decision”). After institution, Patent Owner filed a Response (Paper 18, “PO Resp.”), to which Petitioner filed a Reply (Paper 25, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 27, “Sur-reply”).

Patent Owner also filed a Contingent Motion to Amend (Paper 19, “Mot.”), to which Petitioner filed an Opposition (Paper 24, “Opp.”), Patent Owner filed a Reply (Paper 26, “Mot. Reply”), and Petitioner filed a Sur-reply (Paper 31, “Mot. Sur-reply”).

Petitioner relies, *inter alia*, upon a declaration from Dr. Juan C. Nava (Ex. 1016).

At the request of the parties, no oral argument was held in this case. Paper 31; Ex. 3002.

For the reasons that follow, we conclude that proposed substitute claims 104, 106, 108, 110, 114, 116, 118, 127, 132–135, 138, 141, 144, 146, 149, 152, 155, 158, 159, and 161 are unpatentable. Conversely, proposed substitute claims 105, 107, 109, 111, 112, 113, 115, 117, 119–126, 128–131,

136, 137, 139, 140, 142, 143, 145, 147, 148, 150, 151, 153, 154, 156, and 157 have not been shown to be unpatentable.

For the reasons that follow, original claims 19–61, 63–77, and 79 have been shown to be unpatentable, but claims 78, 80, and 81 have not been shown to be unpatentable.

Accordingly, we grant-in-part and deny-in-part Patent Owner’s Contingent Motion to Amend and find some original claims to be unpatentable.

II. BACKGROUND

A. Related Matters

The parties identify the following proceedings as related matters: (1) *Terves LLC v. Yueyang Aerospace New Materials Co. Ltd, et al.*, No. 1:19-cv-1611 (N.D. Ohio); (2) *Terves LLC v. Yueyang Aerospace New Materials, Co, Ltd, et al.*, No. 2022-1855, 2022-2151 (Fed. Cir.); and (3) *Terves LLC v. Magnesium Machine, LLC*, No. 5:23-cv-00133 (W.D. Okla.). Paper 3, 2; Pet. 2–3.

B. Real Parties in Interest

Petitioner identifies itself as the real party in interest and notes that Mr. Huang Guangsheng is its largest shareholder and legal representative. Pet. 1.

Patent Owner identifies itself as the real party in interest. Paper 3, 2.

C. The ’740 Patent

The ’740 patent is titled “Galvanically-Active in Situ Formed Particles for Controlled Rate Dissolving Tools” and discloses a magnesium composite for use as a dissolvable component in oil drilling. Ex. 1001, code (54), 1:16–17. The magnesium composite, in the form of a ball or other

structure, may be seated in a hydraulic operation and subsequently “dissolved away” so that “no drilling or removal of the structure is necessary.” *Id.* at 1:19–24.

The ’740 patent explains that “[g]enerally, the magnesium composite includes over 50 wt. % magnesium and less than about 99.5 wt. % magnesium and all values and ranges therebetween.” Ex. 1001, 31:54–58. To this magnesium composite is added one or more additives, which are selected and used in quantities “so that galvanically-active intermetallic or insoluble precipitates form in the magnesium or magnesium alloy while the magnesium or magnesium alloy is in a molten state and/or during the cooling of the melt.” *Id.* at 31:58–65. The “formation of particles in the melt is called in situ particle formation” and “can be used to achieve a specific galvanic corrosion rate in the entire magnesium composition and/or along the grain boundaries of the magnesium composite.” *Id.* at 32:17–22. The rate of corrosion may also be controlled through adjustment of the in situ precipitate particle size, with smaller particles increasing the dissolution rate of the magnesium composite. *Id.* at 32:45–57.

In various embodiments, the magnesium composite may include over 50 wt. % magnesium and from 0.01–49.5 wt. % nickel, copper, or cobalt. Ex. 1001, 6:63–7:4, 7:23–32, 7:50–59. In addition to single additive compositions, the ’740 patent contemplates using more than one additive, including one or more of nickel, copper, and cobalt. *Id.* at 2:56–58, 13:39–57.

D. Illustrative Claim

Petitioner challenges claims 19–61 and 63–81 of the '740 patent. Pet. 5–6. Claim 19, reproduced below, is illustrative of the challenged claims:

19. A dissolvable magnesium cast composite comprising a mixture of magnesium or a magnesium alloy and an additive material, said additive material includes one or more metals selected from the group consisting of a) copper wherein said copper constitutes at least 0.01 wt. % of said dissolvable magnesium cast composite, b) nickel wherein said nickel constitutes at least 0.01 wt. % of said dissolvable magnesium cast composite, and c) cobalt wherein said cobalt constitutes at least 0.01 wt. % of said dissolvable magnesium cast composite, said magnesium composite includes in situ precipitate, said in situ precipitate includes said additive material, a plurality of particles of said in situ precipitate having a size of no more than 50 μm , said magnesium composite has a dissolution rate of at least 5 $\text{mg}/\text{cm}^2/\text{hr.}$ in 3 wt. % KCl water mixture at 90° C.

Ex. 1001, 40:14–28.

E. Asserted Grounds of Unpatentability

Petitioner asserts that claims 19–61 and 63–81 of the '740 patent would have been unpatentable on the following grounds (Pet. 6):

Claim(s) Challenged¹	35 U.S.C. §²	Reference(s)/Basis
19–61, 63–81	102	Doud ³
19–61, 63–81	103	Xu ⁴ ,
19, 21, 29, 49–52, 58, 64, 76, 77	103	Xiao ⁵ , Xu

III. ANALYSIS

A. Legal Standard

“[A] claim is anticipated when each and every limitation is expressly or inherently disclosed in a single prior art reference.” *King Pharm., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1274 (Fed. Cir. 2010) (quotations omitted).

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and “the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.”

¹ Petitioner challenges claims 1–81 as being anticipated by Doud and having been obvious over Xu. Pet. 6. Petitioner also challenges claim 1 as both being anticipated by Xiao and having been obvious in view of Xiao and Xu. As Patent Owner has disclaimed claims 1–18 and 62 of the ’740 patent, we do not consider those claims in the challenged grounds.

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102 and 103, effective March 16, 2013. Because each application in the priority chain of the ’740 patent was filed after March 16, 2013, we apply the AIA versions of §§ 102 and 103. *See* 35 U.S.C. § 100(i)(1)(B).

³ US 2015/0299838 A1, published October 22, 2015. Ex. 1005 (“Doud”).

⁴ US 2013/0299185 A1, published November 14, 2013. Ex. 1007 (“Xu”).

⁵ CN 103343271 A, published October 9, 2013. Ex. 1006 (“Xiao”) (certified translation).

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

In order to determine whether an invention would have been obvious at the time the application was filed, we consider the level of ordinary skill in the pertinent art. *Graham*, 383 U.S. at 17. The resolution of this question is important because it allows us to “maintain[] objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991).

In assessing the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quotation omitted).

Petitioner contends that a person of ordinary skill in the art “would have at least a Ph.D. in chemistry, metallurgy, or material science or material engineering” or, in the alternative, “would have a Bachelor of Science or Master of Science degree in one of these disciplines plus experience involving the use and design of dissolvable metal alloys for use in creating tools and other downhole parts for well drilling or completion activities.” Pet. 13–14.

Patent Owner does not oppose Petitioner's contentions regarding the level of ordinary skill in the art. PO Resp. 12 n.4.

Upon review of the prior art of record and the parties' arguments, we adopt Petitioner's unopposed definition of the ordinarily skilled artisan as it is consistent with the prior art of record.

C. Claim Construction

In an *inter partes* review proceeding, a patent claim is construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b) (2023). This rule adopts the same claim construction standard used by Article III federal courts, which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. Under this standard, the words of a claim are generally given their "ordinary and customary meaning," which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *See Phillips*, 415 F.3d at 1312–13.

With respect to claim 19, Petitioner proposes constructions for the terms "in situ precipitate" and "a plurality of particles of said in situ precipitate having a size of no more than 50 μm ." Pet. 11–12. With respect to claims 76–81, Petitioner proposes a construction for the term "wherein said additive material includes one or more metal materials selected from the group consisting of 0.1–35 wt. % copper, 0.1–24.5 wt. % nickel and 0.1–20 wt. % cobalt." *Id.* at 13.

Patent Owner contends no claims require construction for purposes of this Decision. PO Resp. 12 n.4, 17–18; Mot. 16–17.

Upon review of the prior art of record, we determine that no claim terms require express construction for purposes of this Final Written Decision. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

D. Summary of Institution Decision and Issues Presented for Resolution

1. Institution Decision

As noted above, Patent Owner disclaimed claims 1–18 and 62 of the ’740 patent. Ex. 2008; Ex. 2009. Thus, only claims 19–61 and 63–81 remain in this proceeding. PO Resp. 1; Pet. Reply 1; 37 C.F.R. § 42.107(e) (“No *inter partes* review will be instituted based on disclaimed claims.”).

In the Institution Decision, we preliminarily determined that there was insufficient written description support in the priority applications for claims 19–61 and 63–75 of the ’740 patent and, therefore, applied Doud as prior art to these claims. Inst. Dec. 12–13. Applying Doud as prior art, we determined that Petitioner demonstrated a reasonable likelihood that claims 19–61 and 63–75 are anticipated by Doud. *Id.* at 15–17.

For challenged claims 76–81, we preliminarily determined that there was sufficient written description support in the priority applications for these claims, and therefore did not apply Doud as prior art to these claims. *Id.* at 15. Thus, we noted that “significant questions exist” as to whether Doud anticipates these claims. *Id.* at 16–17. We also determined that Patent Owner presented a “strong argument” that Xu, and the combination of Xiao and Xu, do not render the challenged claims obvious. *Id.* at 20, 24–25.

2. Patent Owner's Contingent Motion to Amend

In its Contingent Motion to Amend, Patent Owner “maintains that challenged claims are patentable as originally issued, but provides the proposed substitute claims to streamline and expedite the proceeding.”

Mot. 1. According to Patent Owner, “[i]f the Board finds the proposed substitute claims to be patentable, [Patent Owner] requests that the Board grant entry of [the] proposed substitute claims.” *Id.* at 1–2. “Alternatively, should the Board not enter the proposed substitute claims, [Patent Owner] submits that at least original claims 76–81 remain patentable.” *Id.* at 2.

3. Patent Owner's Response

In its Response, Patent Owner asserts that “[t]he Board should grant the [Motion to Amend] in full, which would render the Petition” and Patent Owner’s Response “moot.” PO Resp. 2. Patent Owner clarifies, however, that if the Board does not grant the Contingent Motion to Amend, Patent Owner “seeks to uphold the patentability of claims 76-81 only.” *Id.* at 11 n.3 (asserting that “in the alternative to the [Motion to Amend], [Patent Owner] seeks to uphold the patentability of claims 76-81 only”).

II. CONTINGENT MOTION TO AMEND

A. Proposed “Contingent” Motion to Amend

Patent Owner “requests that the Board grant entry of proposed substitute claims 104–163 to replace original claims 19–30, 32–49, 51–61, and 63–81.” Mot. 2 (citing Appx. A and Table 1). As discussed above, Patent Owner asks that we first address the proposed substitute claims and, if those claims are entered, we not address the patentability of the original claims. PO Resp. 11.

In a contingent motion to amend, the entry of proposed substitute claims is contingent upon whether the original claims are found unpatentable. *See* Notice Regarding a New Pilot Program Concerning Motion To Amend Practice and Procedures in Trial Proceedings Under the America Invents Act Before the Patent Trial and Appeal Board, 84 Fed. Reg. 9497, 9498 (Mar. 15, 2019). Thus, for contingent motions to amend, “the final written decision addresses substitute claims only if corresponding original claims are found unpatentable.” *Id.*

Patent Owner provides no statutory or regulatory support for its proposed contingency that is based on the proposed substitute claims being found not unpatentable. As such, although we start our analysis with the proposed substitute claims, as requested by Patent Owner, we also address the patentability of all original claims, even those for which the contingency was satisfied. And, to the extent any original claims are not determined to be unpatentable, we do not enter the proposed substitute claims corresponding to these claims.

B. Illustrative Proposed Substitute Claims

Of the proposed substitute claims, claims 104, 105, and 112 are illustrative and are reproduced below.

Patent Owner proposes to substitute claim 104 for claim 19, which includes the following additions (underlined> and deletions (bracketed):

104. A dissolvable magnesium cast composite comprising a mixture of magnesium or a magnesium alloy and an additive material, said additive material includes one or more metals selected from the group consisting of

a) copper wherein said copper constitutes [at least 0.01] 0.05-35 wt. % of said dissolvable magnesium cast composite,

b) nickel wherein said nickel constitutes [at least 0.01] 0.05-35 wt. % of said dissolvable magnesium cast composite, and

c) cobalt wherein said cobalt constitutes [at least 0.01] 0.05-20 wt. % of said dissolvable magnesium cast composite,

said magnesium composite includes in situ precipitate, said dissolvable magnesium cast composite includes in situ galvanically-active intermetallic precipitate to enable controlled dissolution of the magnesium alloy, said in situ galvanically-active intermetallic precipitate includes said additive material, a plurality of particles of said in situ precipitate having a size of no more than 50 μm ,

said magnesium composite has a dissolution rate of [at least] 5-300 mg/cm²/hr. in 3 wt. % KCl water mixture at 90° C.

Mot. Appendix A (spacing added for clarity).

Patent Owner proposes to substitute claim 105 for claim 20, which includes the following additions (underlined) and deletions (bracketed):

105. The dissolvable magnesium cast composite as defined in claim [19]104, wherein said magnesium composite includes at least 85 wt. % magnesium; said additive material includes one or both of said nickel and said copper.

Id.

Patent Owner proposes to substitute claim 112 for claim 27, which includes the following additions (underlined) and deletions (bracketed):

112. The dissolvable magnesium cast composite as defined in claim [23] 108, wherein said magnesium composite includes at least 50 wt.% magnesium.

Id.

C. Legal Standard

Petitioner bears the burden of persuasion to show that any proposed substitute claim is unpatentable by a preponderance of the evidence.

Lectrosonics, Inc. v. Zaxcom, Inc., IPR2018-01129, Paper 15 (PTAB Feb.

15, 2019) (precedential). “Before considering the patentability of any substitute claims, however, the Board first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.” *Id.* These requirements include showing: (1) that a “reasonable number of substitute claims” have been proposed for each challenged claim (35 U.S.C. § 316(d)(1)(B)); (2) that the proposed amendments respond to a ground of unpatentability involved in the trial (37 C.F.R. § 42.121(a)(2)(i)); and (3) that the amendments do not broaden any challenged claim and do not introduce new matter (35 U.S.C. § 316(d)(3)). *Lectrosonics*, Paper 15 at 4–8.

Patent Owner contends the proposed substitute claims satisfy the requirements of 35 U.S.C. § 316(d)(1)(B) and 37 C.F.R. § 42.121(a)(3). According to Patent Owner, only one proposed substitute claim would replace one original claim (i.e., Patent Owner seeks a one-for-one substitution for each challenged claim), the proposed amendments respond to a ground of unpatentability by requiring that the magnesium cast composite include in situ galvanically-active intermetallic precipitate, and the proposed substitute claims do not add any new matter and narrow the scope of the original claims. *Id.* at 7–16.

Petitioner does not contest that the proposed substitute claims satisfy the requirements of 35 U.S.C. § 316(d)(1)(B) and 37 C.F.R. § 42.121(a)(3). *See generally* Opp.

Upon review of the proposed substitute claims and Patent Owner’s arguments, we determine that Patent Owner demonstrates that the proposed substitute claims satisfy the requirements of 35 U.S.C. § 316(d)(1)(B) and 37 C.F.R. § 42.121(a)(3). In particular, the proposed substitute claims do not enlarge the scope of the claims,

do not introduce new matter, and respond to a ground of unpatentability involved in the trial. Patent Owner also proposes a reasonable number of substitute claims for each challenged claim.

D. Priority

A motion to amend “must set forth written description support for each proposed substitute claim as a whole, and not just the features added by the amendment.” *Lectrosonics*, Paper 15 at 8. A motion to amend must also set forth written description support “in an earlier filed disclosure for each claim for which benefit of the filing date of the earlier filed disclosure is sought.” *Id.* at 7. This requirement “applies equally to independent claims and dependent claims, even if the only amendment to a dependent claim is the identification of the claim from which it depends.” *Id.*

Given the filing dates of the respective applications, the parties’ dispute centers on whether the application that published as U.S. Patent Publication No. 2015/0299838 A1 (Doud) and issued as U.S. Patent No. 9,903,010—Application No. 14/689,295 (Ex. 2027 (the ’295 application))—and Application No. 15/641,439 (which issued as the ’653 patent) (collectively the “priority applications”) provide written description support for the proposed substitute claims. Opp. 12–16; Mot. Reply 10–12.

“To satisfy the written description requirement the disclosure of the prior application must ‘convey with reasonable clarity to those skilled in the art that, as of the filing date sought, the inventor was in possession of the invention.’” *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1306 (Fed. Cir. 2008) (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991)) (internal marks omitted). One may show that it was in possession of the invention through “such descriptive means as words,

structures, figures, diagrams, formulas, etc., that fully set forth the claimed invention.” *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997). “Although the exact terms need not be used *in haec verba*, . . . the specification must contain an equivalent description of the claimed subject matter. A description which renders obvious the invention for which an earlier filing date is sought is not sufficient.” *Id.*

1. *Proposed Substitute Claim 104*

Patent Owner provides a chart identifying where it contends support may be found for proposed substitute claim 104 in the as-filed ’740 patent application (Ex. 2026), Doud (Ex. 1005), and Provisional Application No. 61/981,425, which is a priority application identified in the ’740 patent.⁶ Mot. 10–11.

Petitioner argues that, “[a]lthough there might be written description support for the *individual ranges* having a maximum value of 35 wt. % of Cu or Ni and 20 wt. % of Co in the disclosure of the parent ’653 application, there is no support for the combination of *more additives than one* as presently claimed in claim 104.” Opp. 13–14. Petitioner reasons that “the

⁶ Patent Owner cites to the application as originally filed for the ’740 Patent (Ex. 2026, U.S. Application No. 16/158,915), Doud (Ex. 1005), and Provisional Application No. 61/981,425 (as originally filed) (Ex. 2028). Mot. 10–11. Conversely, Petitioner cites to as-issued U.S. Patent No. 10,329,653 B2 (Ex. 1002) to support its arguments. Opp. 12–17. The proper citations when addressing written description support are to the applications as originally filed, not as published or issued. *Lectrosonics*, Paper 15 at 8. Therefore, citations related to the ’653 patent and Doud should be to the application as originally filed (Exhibit 2027 for Doud, not Exhibit 1005). We find this error to be harmless, however, as there is no dispute that Exhibit 2027, Doud, Application No. 15/641,439, and the ’653 patent share substantially the same written description.

combination of the *more additives than one* at their upper range values would exceed the scope of the written description support provided by the additives in the '653 patent.” *Id.* at 14. For example, Petitioner contends that if more than one of the recited additives is used, the wt. % of additives could be over 50%, and indeed up to 90 wt. %, yet the parent '653 patent does not disclose concentrations of additives over 50%, much less 90 wt. %. *Id.* at 15.

Patent Owner argues that written description support for the individual ranges of Cu, Ni, and Co are expressly found in the '653 patent and this patent makes clear that “[o]ne or more additives” may be added to the metallic primary alloy. Mot. Reply 11–12 (citing Ex. 1002, 2:22–24, 15:64–66, code (57)).

The '295 application⁷ states in the Detailed Description of the Invention section that

The present invention is directed to a novel magnesium composite that can be used to form a castable, moldable, or extrudable component. *The magnesium composite includes at least 50 wt% magnesium.* Generally, the magnesium composite includes over 50 wt% magnesium and less than about 99.5 wt% magnesium and all values and ranges therebetween. One or more additives are added to a magnesium or magnesium alloy to form the novel magnesium composite of the present invention. The one or more additives can be selected in quantities so that galvanically-active intermetallic or insoluble precipitates form in the magnesium or magnesium alloy while the magnesium or magnesium alloy is in a molten state and/or during the cooling of the melt; however, this is not required.

⁷ Petitioner cites solely to disclosures in the '653 patent, as does Patent Owner in contesting Petitioner's arguments. Opp. 12–17; Mot. Reply 11–12. As noted above, this is not the correct disclosure to analyze. As such, we cite to similar disclosures of the parent '295 application.

Ex. 2027, 20:25–21:5 (emphasis added). The disclosure that the “magnesium composite” of “[t]he present invention” “includes at least 50 wt% magnesium” is unambiguous and constitutes strong evidence that the inventors were not in possession of a magnesium composite with less than 50 wt. % magnesium, or additive concentrations above 50 wt. %. *See SciMed Life Systems, Inc. v. Advanced Cardiovascular Systems, Inc.*, 242 F.3d 1337, 1343 (Fed. Cir. 2001) (noting that a description of the “present invention” as having a particular structure “is strong evidence that the claims should not be read to encompass the opposite structure”). Consistent with this conclusion, the original claims of the ’295 application all limited the additive material in the composite to 0.05 wt %–45 wt %. Ex. 2027, 26:1–13, 29:9–15. Likewise, in each example where copper, nickel, or cobalt additives are used in the range recited in the proposed substitute claims, the magnesium composite is “over 50 wt% magnesium,” and any claims that do not require this range of magnesium are limited to an additive range of “about 0.05 wt%–45 wt% of said mixture.”⁸ Ex. 2027, 6:13–7:4, 7:16–19,

⁸ Written description support is considered from the view point of the ordinarily skilled artisan. *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). Patent Owner, bearing the burden to show written description support in any priority application for which it seeks the benefit of its filing date, provides no testimony from an ordinarily skilled artisan regarding written description support in the ’295 application, or any evidence to show what such an artisan would conclude from the express disclosures of the ’295 application. *Lectrosonics*, Paper 15 at 7; *In re NTP*, 654 F.3d 1268, 1276 (Fed. Cir. 2011) (noting that “a patent’s claims are not entitled to an earlier priority date merely because the patentee claims priority . . . Rather, for a patent’s claims to be entitled to an earlier priority date, the patentee must demonstrate that the claims meet the requirements of 35 U.S.C. § 120”). Where there is any ambiguity in the disclosures of the ’295 application, the absence of supporting testimony tends to cut against

26:2–31:2; *see* Ex. 1005 ¶¶ 12, 13, 18, 19, 16–21, 26, 28, claims 16–21, 26–28.

In view of the foregoing, we are not persuaded that Patent Owner has demonstrated that the inventors of the priority applications were in possession of a magnesium cast composite that included less than 50 wt. % magnesium, or greater than 50 wt. % additives. As proposed substitute claim 104 encompasses a magnesium cast composite with up to 90 wt. % additives, and therefore as little as 10 wt. % magnesium, Patent Owner has not demonstrated that the full scope of this claim finds written description support in any application prior to the '915 application, filed on October 12, 2018.

As for the level of additives, as noted by Petitioner, we are directed to no embodiment in which additives constitute more than 45 wt. % of the composition. Opp. 14–15. But an application need not disclose specific embodiments to demonstrate possession of magnesium composites with between 45 and 50 wt. % of additives. On this point, the '295 application indicates that “[t]he magnesium composite includes at least 50 wt% magnesium” and that “the magnesium or magnesium alloy” typically “consists about 50.1 wt. %-99.9 wt. % of the magnesium composite and all values and ranges therebetween.” Ex. 2027, 3:1–2. When in the form of magnesium (and not the magnesium alloy) the additives could therefore constitute up to 50 wt % of the magnesium composite. And, when in the form of the magnesium alloy, the added metals may constitute, for example, as little as 0.05 wt. % zinc, zirconium, or manganese. *Id.* at 11:27–12:2. Thus, when viewed as a whole, the disclosures of the '295 application

Patent Owner’s arguments.

demonstrate that the inventors were in possession of magnesium composites in which the additives constitute 50 wt. % of the composite.

For the foregoing reasons, we determine that Patent Owner has not demonstrated that proposed substitute claim 104 is entitled to a priority date any earlier than October 12, 2018.

2. Proposed Substitute Claims 106, 108, 110, 114, 116, 127, 132–135, 138, 141, 144, 146, 149, 152, 155, 158, 159, and 161

Proposed substitute claims 106, 108, 110, 114, 116, 127, 132–135, 138, 141, 144, 146, 149, 152, 155, 158, 159, and 161 each depend, directly or indirectly, from proposed substitute claim 104 and do not further limit the level of magnesium permitted in the magnesium composite. As such, these claims also lack written description support in the '295 application. Thus, these claims have not been shown to be entitled to an effective filing date any earlier than the October 12, 2018 filing date of the '915 application.

3. Proposed Substitute Claims 105, 107, 109, 111, 115, 125, 126, 136, 137, 142, 143, 147, 148, 153, 154, and 160

Proposed substitute claims 105, 107, 109, 111, 115, 125, 126, 136, 137, 142, 143, 147, 148, 153, 154, and 160 also depend, directly or indirectly, from proposed substitute claim 104, but further require that the magnesium in the magnesium composite is “at least 85 wt. %.” Patent Owner identifies where it contends the subject matter of these claims finds support in the '295 application (although citing to Doud). Mot. 11–13.

Petitioner contends that claim 105 should not be understood to be limited by an implied maximum additive concentration of 15 wt. % and, therefore, has an upper limit of 90 wt. % for the recited additives. Opp. 7–8, 16. Petitioner reasons that dependent claims 136 and 137 provide for nickel up to 23.5 wt. %, claims 142 and 143 provide for copper up to 35 wt. %, and

claims 153 and 154 provide for cobalt up to 20 wt. % of the cast composite, which collectively exceed an implied maximum concentration of 15 wt. % for the additives. *Id.* at 7–8.

Proposed substitute claim 105 requires the magnesium cast composite to include “at least 85 wt. % magnesium.” Mot. Appendix A. The claims depending therefrom cannot enlarge the range of additives permitted in the composite. As such, the proposed substitute claims are effectively narrower in scope than the recited additive concentrations might suggest, allowing only 0.1–15 wt. % nickel (claims 136 and 137), 15 wt. % copper (claims 142 and 143), and 0.1–15 wt. % cobalt (claims 153 and 154). These concentrations find support in the ’295 application. Ex. 2027, 3:1–2 (“Typically, the magnesium or magnesium alloy constitutes about 50.1 wt%-99.9 wt% of the magnesium composite and all values and ranges therebetween.”); 2:21–25 (“One or more additives are added to a magnesium or magnesium alloy to form the novel magnesium composite of the present invention.”), 6:12–16 (disclosing a magnesium composite with “about 0.05-35 wt% nickel (and all values or ranges therebetween)”), 7:1–4 (“about 0.05-35 wt% copper (and all values or ranges therebetween)”), 7:16–20 (“about 0.05-20 % by weight cobalt”).

In view of the foregoing, Patent Owner demonstrates that the subject matter of claims 105, 107, 109, 111, 115, 125, 126, 136, 137, 142, 143, 147, 148, 153, 154, and 160 is adequately supported by the disclosures of the priority applications.

4. Proposed Substitute Claims 112, 113, 117–124, 128–131, 139, 140, 145, 150, 151, 156, 157, 162, and 163

Proposed claims 112 and 113 require “at least 50 wt. % magnesium.” Mot. Appendix A. Petitioner contends there is no literal support for a

composite with between 45 and 50 wt. % additives. Opp. 17. As such, Petitioner contends that proposed claims 112 and 113, as well as all claims that depend from these claims (claims 117–124, 128–131, 139, 140, 150, 151, 156, 157, 162, and 163), lack written description support in the priority applications. *Id.*

For the reasons discussed above, we find that the '295 application provides sufficient written description support for a magnesium cast composite that contains “at least 50 wt. % magnesium” and up to 50 wt. % additives. As such, Patent Owner sufficiently demonstrates written description support in the priority applications for claims 112, 113, 117–124, 128–131, 139, 140, 145, 150, 151, 156, 157, 162, and 163.

5. Conclusion – Priority

For the reasons set forth above, Patent Owner demonstrates that the '295 application provides written description support for claims 105, 107, 109, 111–113, 115, 117–126, 136, 137, 139, 140, 142, 143, 145, 147–148, 150, 151, 153, 154, 156, 157, 160, 162, 163. There is also no dispute that the relevant disclosures are also found in the application that ultimately issued as the '653 patent. As such, these claims are entitled to the benefit of the filing date of at least the '295 application.

Petitioner does not demonstrate, however, that the '295 application sufficiently supports proposed substitute claims 104, 106, 108, 110, 114, 116, 127, 132–135, 138, 141, 144, 146, 149, 152, 155, 158, 159, and 161. As such, these claims are not entitled to the filing date of the '295 application.

E. Indefiniteness

Petitioner contends that several proposed substitute claims are indefinite. Opp. 2–11. We address these arguments below.

1. *Proposed Substitute Claim 104*

a. *“in situ precipitate”*

Proposed substitute claim 104 recites “said magnesium composite includes in situ precipitate,” as well as “said dissolvable magnesium cast composite includes in situ galvanically-active intermetallic precipitate to enable controlled dissolution of the magnesium alloy, said in situ galvanically-active intermetallic precipitates includes the additive material.” Mot. Appendix A. Petitioner contends that it is unclear whether “in situ precipitate” and “in situ galvanically-active intermetallic precipitate” are separate elements of the dissolvable magnesium cast composite, or whether they refer to the same thing. Opp. 2. Petitioner further contends that, if interpreted as two separate elements, it is unclear whether the additive is part of the first recited in situ precipitate or not. *Id.* at 2–3.

Patent Owner contends that one of ordinary skill in the art would have understood that “in situ precipitate and in situ galvanically-active intermetallic precipitate” are “progressive terms referring to the same thing and that the latter use of in situ precipitate is discernable whether the words ‘galvanically-active intermetallic’ are included or omitted.” Mot. Reply 3–4.

The definiteness requirement of § 112(a) is satisfied when “a patent’s claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable clarity.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910

(2014); *see* 37 C.F.R. § 42.100(b) (changing the claim construction standard used to review a claim proposed in a motion to amend from the broadest reasonable construction to the “same construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b)”). Proposed substitute claim 104 generically requires “in situ precipitate” and also a specific type of in situ precipitate: “in situ galvanically-active intermetallic precipitate.” Mot. Appendix A. Although this claim would have best been clarified by Patent Owner after seeking preliminary guidance on its Motion to Amend, upon review of the written description, claims, and figures of the ’740 patent, as well as Patent Owner’s clarification in its Reply to the Opposition, we agree with Patent Owner that one of ordinary skill in the art would have understood that the “in situ galvanically-active intermetallic precipitate” is merely a more complete description of the “in situ precipitate” mentioned earlier in the sentence. Mot. Reply 4. As such, we do not find that this part of proposed substitute claim renders claim 104 indefinite.

b. *“dissolvable magnesium cast composite” or “magnesium composite”*

Proposed substitute claim 104 recites both a “dissolvable magnesium cast composite” and a “magnesium composite.” Mot. Appendix A. Petitioner contends that it is unclear “what concentration of magnesium is required before a magnesium containing composite would fall within the scope of the protection sought by claim 104.” Opp. 4–5. In particular, Petitioner asserts that proposed substitute claims 112 and 113 add the requirement that the magnesium cast composite include at least 50 wt. % magnesium, implying that proposed substitute claim 104 does not require a minimum concentration of 50 wt. %. *Id.* at 5.

Patent Owner contends there is no ambiguity in proposed substitute claim 104, as the plain language includes no lower limit for magnesium, and “anything that falls within the limitations of the claims is a ‘dissolvable magnesium cast composite’” or a “magnesium composite.” Mot. Reply 4–5.

Proposed substitute claim 104 is clear on its face. There is no lower limit for magnesium in the claim (other than the fact that it must be present). And, although Patent Owner has not demonstrated that the broad range of magnesium and additives allowed by proposed substitute claim 104 finds written description support in earlier priority applications, this broad range does not render the claim indefinite.

2. Proposed Substitute Claims 105, 107, 109, 111, 115, 125, 126, 136, 137, 142, 143, 147, 148, 153, 154, and 160

Petitioner contends claim 105, and proposed substitute claims 107, 109, 111, 115, 125, 126, 136, 137, 142, 143, 147, 148, 153, 154, and 160 that depend therefrom, are indefinite. Opp. 6–8. Petitioner reasons that the “said nickel and said copper” in proposed substitute claim 105 refers back to the nickel and copper recited in claim 104, but it is not clear whether claim 105 is “exclusive of cobalt” or “what the overall maximum range of additives are.” *Id.* at 8. We disagree on both points.

a. Nickel and Copper

Read in combination with proposed substitute claim 104, claim 105 requires that one of, or both of, nickel and copper are in the additive material. This is narrower than claim 104, wherein any one of, or any combination of, the Markush group of cobalt, nickel, and copper may constitute the additive material. Thus, an additive material containing cobalt and copper could read on both claims 104 and 105 (assuming all other

limitations are present), but an additive material containing only cobalt would only read on claim 104.⁹ Thus, proposed substitute claim 105, and its dependents, are not indefinite for failing to clarify whether proposed substitute claim 105 is “exclusive of cobalt.”

b. *Additives over 15 wt. %*

Although proposed substitute claim 105 expressly requires magnesium at levels of “at least 85 wt. %,” Petitioner contends it is not clear that additives are in fact limited to 15 wt. % of the composition because

proposed dependent claims 136 and 137 provide for Ni up to 23.5 wt % of the cast composite, proposed claims 142 and 143 provide for Cu up to 35 wt. % of the cast composite, proposed claims 153 and 154 provide for Co up to 20 wt. % of the cast composite, and proposed claim 160 recites a Markush group of Cu up to 35 wt. %, Ni up to 24.5 wt. %, and Co up to 20 wt % of the cast composite, all of which exceeds an implied maximum concentration of 15 wt. % for the additives.

Opp. 7–8.

Selecting the highest recited levels of nickel, cobalt, or copper, dependent claims 136, 137, 142, 143, 153, and 154 could be read as allowing constituents totaling greater than 15 wt. %. A claim that could theoretically be read to encompass formulations containing constituents totaling more than a claim from which it depends would allow, however, is not indefinite on that basis. *See In re Kroekel*, 504 F.2d 1143, 1146 (CCPA 1974) (“Clearly, a rejection based on indefiniteness cannot stand simply because the proportions actually

⁹ Claim 105 uses the open-ended claim term “includes,” but claim 105 is already limited by the Markush group language of claim 104. Thus, the open term “includes” does not allow additive material that is not included in claim 104.

recited in the claims may be read in theory to include compositions that are impossible to formulate.”).

In this case, proposed substitute claim 105 expressly limits the magnesium composition to those including “at least 85 wt. % magnesium.” All claims that depend from this claim are therefore limited to at most 15 wt. % additives, and one of ordinary skill in the art would have understood the wt. % of the recited additive(s) that could be included in the composition. For example, proposed substitute claim 142 depends from proposed substitute claim 105 and further requires “wherein said additive material includes copper, said copper constitutes [0.01-35] 15-35 wt. % of said dissolvable magnesium composite.” Given the requirement for at least 85 wt. % magnesium, the only amount of copper that could read on claim 142 is 15 wt. %. Although Patent Owner’s election to draft the claims in this manner may severely limit the scope of proposed substitute claim 142, it does not render it indefinite. *See Kroekel*, 504 F.2d at 1146.

In view of the foregoing, we determine that the evidence of record does not demonstrate that claims 105, 107, 109, 111, 115, 125, 126, 136, 137, 142, 143, 147, 148, 153, 154, and 160 are indefinite for specifying additive weight percentages that, if the highest recited levels of each additive were chosen, may be impossible to achieve.

3. Proposed Substitute Claim 118

Proposed substitute claim 106 recites, in relevant part, “a dissolution rate of the magnesium composite being 40 mg/cm²/hr. in 3 wt. % KCl water mixture at 90°C.” Proposed substitute claim 118 depends indirectly from proposed substitute claim 106 and further recites

wherein said dissolvable magnesium cast composite has a dissolution rate of one of a) 40 [-325] mg/cm²/hr. in 3 wt. % KCl water mixture at 90° C, b) 45 mg/cm²/hr. in 3 wt. % KCl water mixture at 90° C, c) 50 mg/cm²/hr. in 3 wt. % KCl water mixture at 90° C, d) 75 mg/cm²/hr. in 3 wt. % KCl water mixture at 90° C, e) 84 mg/cm²/hr. in 3 wt. % KCl water mixture at 90° C, f) 100 mg/cm²/hr. in 3 wt. % KCl water mixture at 90° C or g) 110 mg/cm²/hr. in 3 wt. % KCl water mixture at 90° C.

Mot. Appendix A.

Petitioner contends that the additional recited dissolution rates “fall outside the scope of claim 106” and, therefore, the claim “fails to further limit the subject matter of the parent claim 106 which also causes the scope to be unclear.” Opp. 8.

Patent Owner contends that claim 113, from which claim 118 depends, narrows the scope of the claim to magnesium composites that contain aluminum at 0.5 to 10 wt. %. Mot. Reply 7. And, because claim 118 includes the same dissolution rate as claim 106, Patent Owner contends it is not irreconcilable with claim 106. *Id.*

Each dependent claim must narrow the scope of the claim from which it depends. 35 U.S.C. § 112(d). Proposed substitute claim 106 requires a specific dissolution rate of “40 mg/cm²/hr. in 3 wt. % KCl water mixture at 90°C.” Claim 118 then expands the permissible dissolution rates in 3 wt. % KCl at 90°C to include 40, 45, 50, 75, 84, 100, and 110 mg/cm²/hr. As proposed substitute claim 118 does not further limit the scope of proposed substitute claim 106, but rather expands the dissolutions rate to include rates that are precluded in the claim from which it depends, it is invalid. 35 U.S.C. § 112(d).

As noted by Patent Owner, proposed substitute claim 113 narrows the scope of proposed substitute claim 106 to composites containing 0.5–10 wt. % aluminum. Mot. Reply 7. This does not save the claim, however, because claim 106 limits the dissolution rate to “40 mg/cm²/hr. in 3 wt. % KCl water mixture at 90°C,” and claim 118 is inconsistent with this claim, allowing dissolution rates that are higher than the recited 40 mg/cm²/hr. level. A dependent claim that contradicts, rather than narrows, the claim from which it depends is invalid. See *Multilayer Stretch Cling Film Holdings, Inc. v. Berry Plastics Corp.*, 831 F.3d 1350, 1362 (Fed. Cir. 2016); *Sisvel Int’l S.A. v. Sierra Wireless, Inc.*, 81 F.4th 1231, 1241 (Fed. Cir. 2023) (noting that if a substitute claim “is broader *in any respect* [it] is considered to be broader than the original claim[] even though it may be narrower in other respects”) (quoting *Hockerson-Halberstadt*, 183 F.3d 1369, 1374 (Fed. Cir. 1999)).

4. Proposed Substitute Claims 119–134

Claims 119–134 require that the “magnesium alloy includes over 50 wt. % magnesium,” “at least 85 wt. % magnesium,” or between “60-95 wt. % magnesium.” Proposed substitute claim 104, from which these claims ultimately depend, is directed to a “dissolvable magnesium cast composite comprising a mixture of magnesium or a magnesium alloy and an additive material” Petitioner contends that it is unclear “whether claims 119–134 only limit the magnesium alloy *if present*, whether the claims are open to the inclusion of magnesium also, or whether the claims require that the cast composite include only the magnesium alloy as defined in claims 119–134 in addition to the additive.” Opp. 9.

Patent Owner argues in response that claims 119–134 each recite “wherein said magnesium alloy,” which demonstrates that these claims pertain only to embodiments that include a magnesium alloy, and Petitioner provides no support for its argument that a person of ordinary skill in the art would not have understood these claims. Mot. Reply 8.

We agree with Patent Owner that claims 119–134 pertain only to magnesium composites containing a magnesium alloy. Claim 119 depends from claim 112, which depends from claim 108, which requires that the magnesium composite includes 0.5–10 wt. % aluminum. This is a magnesium alloy. As the compositions of claims 119–134 always include a magnesium alloy, these claims are exclusive of the magnesium metal alternative recited in proposed substitute claim 104. As such, we are not persuaded that these claims are indefinite.

5. Proposed Substitute Claims 162 and 163

Proposed substitute claims 162 and 163 recite “wherein said additive material includes one or more metal materials selected from the group consisting of 0.1–35 wt. % copper, 0.1–24.5 wt. % nickel and 0.1–20 wt. % cobalt.” Parent claims 112 and 113 recite that the “magnesium composite includes at least 50 wt. % magnesium.” Petitioner contends that, because proposed substitute claims 162 and 163 would allow additives at greater than 50 wt. %, i.e., up to 79.5 wt. %, these claims are ambiguous and indefinite. Opp. 11.

In this case, the requirement for at least 50 wt. % magnesium effectively limits the total amount of additives to 50 wt. % of the composite. Thus, proposed substitute claims 162 and 163 could not read on a magnesium composite with additive levels greater than 50 wt. % up to 79.5

wt. %, as asserted by Petitioner. As such, we do not find that claims 162 and 163 are indefinite.

F. Anticipation by Doud

For the reasons set forth above, we determine that the earliest priority date to which claims 104, 106, 108, 110, 114, 116, 127, 132–135, 138, 141, 144, 146, 149, 152, 155, 158, 159, and 161 are entitled is October 12, 2018. Thus, Doud is prior art to these proposed substitute claims.

Petitioner identifies where every limitation of claims 104, 106, 108, 110, 114, 116, 127, 132–135, 138, 141, 144, 146, 149, 152, 155, 158, 159, and 161 is disclosed in Doud. Opp. 18–25. Patent Owner does not address this evidence, asserting only that Doud is not prior art to the challenged claims. Mot. Reply 12. Upon review of Doud and Petitioner’s arguments, we determine that Doud anticipates proposed substitute claims 104, 106, 108, 110, 114, 116, 127, 132–135, 138, 141, 144, 146, 149, 152, 155, 158, 159, and 161.

For the reasons set forth above, we determine that Doud is not prior art to proposed substitute claims 105, 107, 109, 111, 112, 113, 115, 117, 119–126, 128–131, 136, 137, 139, 140, 142, 143, 145, 147, 148, 150, 151, 153, 154, 156, 157, 160, 162, and 163. As Petitioner’s only unpatentability arguments with respect to these claims are based on anticipation by Doud, we are not persuaded that these claims are unpatentable.¹⁰

¹⁰ Although Petitioner has not demonstrated that proposed substitute claims 160, 162, and 163 are unpatentable, before these claims may be entered, we still must address whether original claims 79, 80, and 81 are unpatentable.

III. ORIGINAL CLAIMS

A. Claims at Issue

As discussed above, Patent Owner “seeks to uphold the patentability of claims 76-81 only.” PO Resp. 11 n.3. For the reasons discussed previously, however, we address all challenged claims.

B. Claims 19–61 and 63–75

As discussed in the Institution Decision, independent claim 19 allows for unbounded levels of copper, nickel and cobalt in the dissolvable cast composite. Ex. 1001, 40:14–28; Inst. Dec. 10–13. The written description of the ’740 patent, however, does not support these unbounded levels of copper, nickel, and cobalt, and Patent Owner no longer asserts that these claims are entitled to a priority date prior to October 12, 2018. *Id.*; PO Resp. 11. As such, Patent Owner has not established that claims 19–61 and 63–75 are entitled to the benefit of a filing date on or before the publication date of Doud.

With respect to independent claim 19, Petitioner persuasively identifies where Doud discloses alloy AZ91D with 90 wt. % magnesium, 9 wt. % aluminum, 1 wt. % zinc, and either 1 or 7 wt. % nickel or 10 wt. % copper. Pet. 39–40 (citing Ex. 1005 ¶¶ 45–47). The copper and nickel form in situ precipitates (Ex. 1005 ¶¶ 12–14) having a particles size of 10–50 microns (Ex. 1005 ¶ 6), and the dissolution rate in a 3% KCl solution at 90° C may be 50, 110, and 325 mg/cm²/hr (Ex. 1005 ¶¶ 45–47). *Id.* Petitioner also identifies where Doud discloses that the magnesium composite may include cobalt from 0.05–20 wt.% of the composition. *Id.* at 39 (citing Ex. 1005 ¶¶ 14–15). Thus, claim 19 is anticipated by Doud.

The Petition also persuasively identifies where the subject matter of original dependent claims 19–61 and 63–75 is disclosed in Doud. *Id.* at 41–45. For example, Petitioner identifies where Doud discloses dissolution rates of 50, 110, and 325 mg/cm²/hr in a 3% KCL solution at 90° C (*id.* at 41–42), a magnesium composite with at least 50 wt. % magnesium (*id.* at 41–45), a magnesium composite with at least 9 wt. % aluminum (*id.* at 41–43), and a magnesium composite with 0.1–3wt % zinc and 0.01–1 wt. % zirconium.

As noted above, Patent Owner does not address Petitioner’s arguments with respect to original claims 19–61 and 63–75 and seeks to uphold the patentability of claims 76–81 only. PO Resp. 11 n.3.

In view of the foregoing, we determine that Petitioner demonstrates by a preponderance of the evidence that claims 19–61 and 63–75 are anticipated by Doud.

C. Priority Date for Claims 76–81

Petitioner contends that each of claims 76–81 allows for additives in amounts greater than 50 wt. %, yet there is no written description support in the parent patent for additives in amounts greater than 50 wt. %. Pet. Reply 9–11.

Patent Owner contends that the Petition did not make specific lack of written description arguments with respect to dependent claims 76–81 and “Petitioner should not be permitted to make new written description arguments against claims 76–81 now.” PO Sur-reply 11. This argument confuses the relevant burdens. Once Petitioner asserted that claims 76–81 are anticipated by Doud (Pet. 45) and lack sufficient written description support in an earlier-filed application, the burden of production shifted to

Patent Owner to show why Doud does not anticipate these claims, either due to a lack of relevant disclosures or because Doud is not prior art to the challenged claims. *Dynamic Drinkware, LLC v. National Graphics, Inc.*, 800 F.3d 1375, 1380 (Fed. Cir. 2015). Moreover, there has been significant briefing as to whether the '740 patent is entitled to the benefit of the filing date of its priority applications. *See* Pet. Reply 7–11; Opp. 13–17.

As discussed above, the '295 application is limited to magnesium cast composites in which magnesium constitutes at least 50 wt. % of the composite and additives constitute no more than 50 wt. % of the composite. Claim 19 of the '740 patent, however, implicitly expands the permissible levels of magnesium to include those with less than 50 wt. % magnesium. For example, while claim 1 specifically requires that “the magnesium content in said dissolvable magnesium alloy is greater than 50 wt. %, claim 19 includes no such limitation. Ex. 1001, 38:46–67, 40:14–28. In addition, claim 27 depends indirectly from claim 19 and further requires “wherein said magnesium composite includes at least 50 wt. % magnesium.” *Id.* at 40:52–54. This demonstrates that claim 19 encompasses magnesium composites wherein the magnesium content is less than 50 wt. % and the additive content may be above 50 wt. %.

Claims 76, 77, and 79 all depend, directly or indirectly, from claim 19 and do not further limit the level of magnesium in the magnesium composite. As such, these claims lack sufficient written description support in the '295 application and are not entitled to the filing date of that application.¹¹

¹¹ Both parties note that in the Institution Decision we stated that “there appears to be no dispute that Doud provides written description support for

Claims 78, 80, and 81 also depend indirectly from claim 19, but the amount of magnesium in these claims is at least 85 wt. % (claim 78) or at least 50 wt. % (claims 80 and 81). For the reasons discussed above, there is written description support for magnesium cast composites with at least 50 wt. % magnesium and the levels of copper, nickel, and cobalt recited in claims 78, 80, and 81. As such, these claims find adequate written description support in the priority applications. As such, Doud is not prior art to claims 78, 80, and 81.

D. Anticipation by Doud of Claims 76–81

Petitioner contends that challenged claims 76–81 are anticipated by Doud. Pet. 45. In particular, Petitioner contends that Doud discloses embodiments in which a magnesium cast composite includes a magnesium alloy AZ91D with 90 wt. % magnesium, 9 wt. % aluminum, 1 wt. % zinc, and either 1 or 7 wt. % nickel or 10 wt. % copper. *Id.* (citing Ex. 1005 ¶¶ 45–47). The copper and nickel form in situ precipitates (Ex. 1005 ¶¶ 12–14) having a particles size of 10–50 microns (Ex. 1005 ¶ 6), and the dissolution rate in a 3% KCl solution at 90° C may be 50, 110, and 325 mg/cm²/hr (Ex. 1005 ¶¶ 45–47).

Patent Owner does not contest that Doud anticipates claims 76–81, if the patent publication is prior art to these claims.

the recited levels of copper, nickel, and cobalt in claims 76–81” and that “these claims are entitled to the benefit of the filing date of Doud.” Inst. Dec. 15. This conclusion was based on the arguments and evidence of record at that time. In any event, the burden of demonstrating entitlement to the benefit of an earlier filing date rests upon Patent Owner, and Petitioner raises significant issues with respect to whether claims 76–81 are entitled to the benefit of the filing date of any earlier filed application.

Upon review of Doud and the parties' arguments, we find that Doud discloses every limitation of claims 76, 77, and 79. Accordingly, Petitioner demonstrates by a preponderance of the evidence that these claims are anticipated by Doud.

With respect to claims 78, 80, and 81, for the reasons set forth above, Doud is not prior art with respect to these claims. As such, these claims are not anticipated by Doud.

E. Obviousness of Claims 76–81

Petitioner contends the subject matter of claims 76–81 would have been obvious over Xu, and the subject matter of claims 76 and 77 would have been obvious over the combined disclosures of Xu and Xiao.

Having determined that claims 76, 77, and 79 are anticipated by Doud, we do not reach the obviousness grounds based on Xu, or Xu and Xiao with respect to these claims. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App'x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

With respect to original claims 78, 80, and 81, these claims are each directed to a “dissolvable magnesium cast composite.” Ex. 1001, 44:28–32, 44:38–47. Xu teaches a powder compact having a cellular nanomatrix and a metal matrix which are compacted and sintered. Ex. 1007 ¶¶ 31, 41. Xu

also teaches that its compositions are distinguishable from metal alloys formed by casting from a melt. *Id.* ¶ 59.

Petitioner contends that, despite Xu distinguishing between sintering and casting processes, both processes were well known in the art and one of ordinary skill in the art would have been able to extend the teachings of Xu to a casting process. Pet. Reply 13–14. Petitioner cites to no testimony from a person of ordinary skill in the art addressing the disclosures of paragraph 59 of Xu, however, and Petitioner’s conclusion is in direct conflict with the disclosures of Xu. *Id.* at 14. As such, Petitioner has not demonstrated by a preponderance of the evidence that claims 78, 80, and 81 would have been obvious over Xu.

As claims 78, 80, and 81 have not been shown to be unpatentable, we do not enter their corresponding proposed amended claims, i.e., proposed amended claims 160, 162, and 163.

IV. CONCLUSION¹²

For the foregoing reasons, we grant-in-part and deny-in-part Patent Owner’s Contingent Motion to Amend. Our conclusions are summarized in the following table.

¹² 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).

Motion to Amend

Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	104–163
Substitute Claims: Motion to Amend Granted	105, 107, 109, 111, 112, 113, 115, 117, 119–126, 128–131, 136, 137, 139, 140, 142, 143, 145, 147, 148, 150, 151, 153, 154, 156, 157
Substitute Claims: Motion to Amend Denied	104, 106, 108, 110, 114, 116, 118, 127, 132–135, 138, 141, 144, 146, 149, 152, 155, 158, 159, 161
Substitute Claims: Not Reached	160, 162, 163

For the foregoing reasons, original claims 19–61, 63–77, and 79 have been shown to be unpatentable, but original claims 78, 80, and 81 have not been shown to be unpatentable. Our conclusions are summarized in the following table.

Original Claims:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
19–61, 63–81	102	Doud	19–61, 63–77, 79	78, 80, 81
19–61, 63–81	103	Xu ¹³		78, 80, 81

¹³ We do not address Petitioner’s arguments with respect to the grounds based on Xu or Xiao and Xu with respect to claims 76, 77, and 79.

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
19, 21, 29, 49– 52, 58, 64, 76, 77	103	Xiao, Xu ¹⁴		
Overall Outcome			19–61, 63–77, 79	78, 80, 81

V. ORDER

For the foregoing reasons, it is

ORDERED that Patent Owner’s Contingent Motion to Amend is granted with respect to proposed substitute claims 105, 107, 109, 111, 112, 113, 115, 117, 119–126, 128–131, 136, 137, 139, 140, 142, 143, 145, 147, 148, 150, 151, 153, 154, 156, and 157;

FURTHER ORDERED that Patent Owner’s Contingent Motion to Amend is denied with respect to proposed substitute claims 104, 106, 108, 110, 114, 116, 118, 127, 132–135, 138, 141, 144, 146, 149, 152, 155, 158, 159, and 161;

FURTHER ORDERED that Petitioner has shown by a preponderance of the evidence that claims 19–61, 63–77, and 79 of the ’740 patent are unpatentable;

FURTHER ORDERED that claims 78, 80, and 81 have not been shown to be unpatentable; and

¹⁴ Because claims 76 and 79 are determined to be anticipated by Doud, we do not address Petitioner’s obviousness ground based on Xiao and Xu

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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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