

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.
(TSMC) and SAMSUNG ELECTRONICS CO., LTD,
Petitioner,

v.

DSS TECHNOLOGY MANAGEMENT, INC.,
Patent Owner.

Case IPR2014-01030¹
Patent 5,652,084

Before ERICA A. FRANKLIN, JACQUELINE WRIGHT BONILLA, and
KRISTINA M. KALAN, *Administrative Patent Judges*.

KALAN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

¹ Case IPR2014-01493 has been joined with this proceeding.

I. INTRODUCTION

A. Background

Taiwan Semiconductor Manufacturing Company, Ltd. (“TSMC”) filed a Petition to institute an *inter partes* review of claims 1–16 of U.S. Patent No. 5,652,084 (Ex. 1001, “the ’084 patent”). Paper 1 (“Pet.”). DSS Technology Management, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). On December 31, 2014, we instituted trial as to claims 1–12, 15, and 16 of the ’084 patent. Paper 9 (“Dec.”).

A different party, Samsung Electronics Co., Inc. (“Samsung”), filed a Petition for *inter partes* review of the ’084 patent, which Petition was accorded a filing date of September 12, 2014. Case IPR2014-01493, Paper 1, Paper 4, *see also* Paper 7 (Corrected Petition for *Inter Partes* Review filed October 3, 2014). On January 29, 2015, Samsung also filed a Motion for Joinder to join the case with the previously instituted proceeding in *Taiwan Semiconductor Mfg. Co. v. DSS Tech. Mgmt., Inc.*, Case IPR2014-01030. Case IPR2014-01493, Paper 10. On February 24, 2015, we instituted trial in IPR2014-01493 and joined the case with Case IPR2014-01030. Case IPR2014-01493, Paper 12; Case IPR2014-01030, Paper 15.

During trial, Patent Owner filed a Patent Owner Response (Paper 18, “PO Resp.”), which was accompanied by a Declaration from Dr. Chris A. Mack (Ex. 2007). TSMC and Samsung (collectively, “Petitioner”) filed a Reply to the Patent Owner Response. Paper 22 (“Reply”). An oral hearing was held on August 12, 2015. A transcript of the consolidated hearing has been entered into the record. Paper 27 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

We determine that Petitioner has shown by a preponderance of the evidence that claims 1–12, 15, and 16 of the '084 patent are unpatentable.

B. Related Proceedings

The parties indicate that the '084 patent is involved in the following district court proceeding: *DSS Technology Mgmt., Inc. v. Taiwan Semiconductor Mfg. Co.*, 2-14-CV-00199 (E.D. Tex.) (the “related proceeding”). Pet. 1; Paper 4, Related Matters, 2.

C. The '084 Patent

The '084 patent, titled “Method for Reduced Pitch Lithography,” issued on July 29, 1997. The '084 patent relates to a lithographic patterning process using multiple exposures to provide for relatively reduced pitch for features of a single patterned layer. Ex. 1001, Abstract.

Figure 1, reproduced below, illustrates an exemplary process:

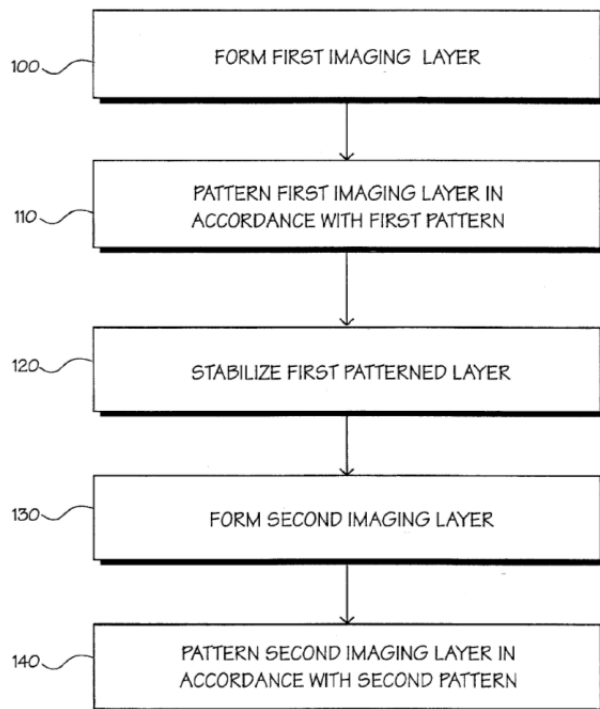
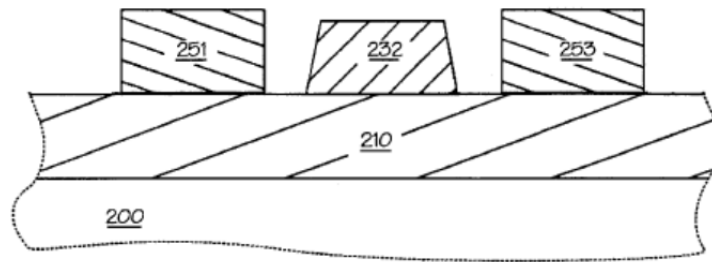


Figure 1 illustrates, in flow diagram form, one lithography method for semiconductor fabrication. *Id.* at 2:7–8.

Figure 5, reproduced below, illustrates a product of the method illustrated in Figure 1:



Specifically, Figure 5 shows a cross-sectional view of a semiconductor wafer as a result of the method of Figure 1. *Id.* at 2:20–22, 7:36–37. After completion of steps 110 and 120 of Figure 1, first patterned layer 232 is formed. *Id.* at 4:31–34. Following completion of steps 130 and 140 of Figure 1, second patterned layers 251 and 253 are formed. *Id.* at 6:51–53. As a result of the method of Figure 1, a single patterned layer is formed over layer 210 as illustrated in Figure 5. *Id.* at 7:36–37.

D. Illustrative Claims

Of the instituted claims, claims 1 and 15 are independent. As to the remaining instituted claims, claims 2–12 directly depend from claim 1, and claim 16 depends from claim 15.

Claim 1 of the '084 patent is illustrative of the claims at issue:

1. A lithography method for semiconductor fabrication using a semiconductor wafer, comprising the steps of:
 - (a) forming a first imaging layer over the semiconductor wafer;
 - (b) patterning the first imaging layer in accordance with a first pattern to form a first patterned layer having a first feature;
 - (c) stabilizing the first patterned layer;

- (d) forming a second imaging layer over the first pattern layer;
and
- (e) patterning the second imaging layer in accordance with a second pattern to form a second patterned layer having a second feature distinct from the first feature, wherein the second patterned layer and the first patterned layer form a single patterned layer, and wherein the first and second features which are formed relatively closer to one another than is possible through a single exposure to radiation.

Ex. 1001, 13:6–24.

E. Prior Art Supporting Instituted Unpatentability Grounds

1. Japanese Patent App. No. H04-71222, published March 5, 1992 (“Jinbo”) (Ex. 1011) (Ex. 1004).²
2. US Patent No. 4,931,351, issued June 5, 1990 (“McColgin”) (Ex. 1006).
3. US Patent No. 4,548,688, issued October 22, 1985 (“Matthews”) (Ex. 1007).

F. Instituted Unpatentability Grounds

We instituted an *inter partes* review of claims 1–12, 15, and 16 of the ’084 patent on the following grounds. Dec. 19.

References	Basis	Claims Challenged
Jinbo	§ 102(b)	1–8, 12, 15, and 16
Jinbo and McColgin	§ 103(a)	9
Jinbo and Matthews	§ 103(a)	10 and 11

² Petitioner relies on a certified English translation of Jinbo submitted as Exhibit 1004 (in original and corrected versions). All references to Jinbo in this Decision refer to the corrected version of Exhibit 1004.

II. ANALYSIS

For the challenged claims, Petitioner must prove unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e). We begin with a claim construction analysis, and then follow with specific analysis of the prior art.

A. Claim Construction

The subject patent expired on or about December 22, 2014. PO Resp. 9; Reply 2 n.2; Ex. 1001. We construe expired patent claims according to the standard applied by the district courts. *See In re Rambus, Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012). Specifically, we apply the principles set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). Only those terms which are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Specifically, words of a claim are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history of record. *Phillips*, 415 F.3d at 1312–14. We do not apply a presumption of validity, and we evaluate Petitioner’s burden of proof under the preponderance of evidence standard. *Cisco Sys., Inc. v. AIP Acquisition, LLC*, Case IPR2014-00247, Paper 17, slip op. at 3–4 (PTAB June 26, 2014).

1. Second pattern

As discussed by the parties, in our Decision to Institute, we interpreted the term “second pattern” as “any suitable pattern in accordance with which the second imaging layer is selectively irradiated.” Dec. 7–8. In other words, the second pattern can be any geometric pattern, including a pattern the same as the first pattern, provided that the second pattern is a separate element. *Id.* at 8.

Both Patent Owner and Petitioner generally agree with the claim construction of the term “second pattern” as adopted in our Decision to Institute. PO Resp. 10; Reply 2–4. Patent Owner agrees with the construction insofar as it requires that the first and second patterns are two separate individual elements that are not one and the same. PO Resp. 10. Patent Owner, however, proposes that the Board modify its construction as follows: “any suitable pattern in accordance with which the second imaging layer is selectively irradiated...provided that the second pattern is a separate element and is not a duplicate of the first pattern.” *Id.* at 19.

Petitioner replies that Patent Owner’s new proposed construction attempts to “read in a difference between the first and second patterns that the claim language does not require and that actually contradicts the totality of the intrinsic evidence.” Reply 3. Petitioner notes that, in the related proceeding, the district court construed the claim terms as follows: “‘first pattern’ to mean ‘a pattern in accordance with which the first imaging layer is selectively irradiated’” and “‘second pattern’ to mean ‘a pattern in accordance with which the second imaging layer is selectively irradiated.’” *Id.* at 6 (citing Ex. 1016, 18).

The rationale of the district court, cited by Petitioner, is as follows:

[Patent Owner] would have this Court import an embodiment from the specification. Such a conclusion is wrong for multiple reasons. First, there is no disavowal or clear disclaimer of the well understood claim language. In contrast, the specification clearly states repeatedly that “any suitable pattern of opaque and clear features that may depend, for example, on the desired pattern to be formed in [the] imaging layer.” 3:59–62; 6:23–25; 8:11–14; 8:65–9:1; 10:61–64, and 11:49–52. In this regard, the specification could not be clearer: a particular pattern is not required for the first and second patterns. Second, it is not even clear that in the exemplary specification embodiments, the first and second patterns are different. For example, the first and second patterns shown in Figures 2–5, 7–11 and 13–16, respectively, may each be the same pattern, just shifted horizontally.

Id. at 17 (citing Ex. 1016, 17). Although we are not bound by the construction or reasoning of the district court, which was rendered after we issued our Decision to Institute but before oral hearing, we have considered it. As discussed, the ’084 patent has expired, and we apply the same standard for claim construction as the district court. Accordingly, we do not disregard the analysis and conclusions of a court applying the same claim construction standard to the same claim term in a concurrent proceeding concerning the same patent. *Power Integrations, Inc. v. Lee*, 797 F.3d 1318, 1326–1327 (Fed. Cir. 2015) (discussing Board’s error in declining to address or acknowledge the district court’s claim construction).

In further support of its argument, Petitioner cites to the prosecution history of a divisional application, in which then-applicant Patent Owner amended a claim to require that the first and second patterns be “different.” Reply 10 (citing Ex. 1018, 84, 87). Petitioner notes that the Examiner rejected the amendment under 35 U.S.C. § 112, finding that there was inadequate written description support in the specification. *Id.* (citing

Ex. 1018, 101). Petitioner further notes that Patent Owner's reliance on the abstract's disclosure of "two separate patterns" refers to a separate, unclaimed embodiment that was subject to a restriction requirement, and not elected. *Id.* at 11–12. Petitioner characterizes this argument as responsive to Patent Owner's argument in the Patent Owner Response that the first and second patterns must be different. Tr. 14:16–21. We consider this argument together with the totality of the evidence presented.

Patent Owner argues that the second pattern cannot be a duplicate of the first pattern, citing case law in support of the proposition that the terms "first" and "second" signify the presence of two structurally different elements. PO Resp. 12–13. Petitioner disputes Patent Owner's interpretations of the supporting case law. Reply 12–15. On this subject, we agree that the terms "first" and "second" commonly are used to distinguish between repeated instances of an element or limitation, and need not refer to structurally different elements. *Free Motion Fitness, Inc. v. Cybex Int'l, Inc.*, 423 F.3d 1343, 1348 (Fed. Cir. 2005); *see also* Ex. 1019 (Reporter's Transcript of Claim Construction Hearing, March 3, 2015) 36:6–18.

Finally, Patent Owner argues that interpreting the first and second patterns as duplicates either renders the patent inoperable, or requires additional steps outside the disclosure (PO Resp. 13); and that the disclosure of the '084 patent supports that the two patterns are not duplicates of one another. *Id.* at 16.

Petitioner disagrees with Patent Owner's inoperability argument, citing Patent's Owner's expert testimony in support of the proposition that shifting and aligning a wafer relative to a mask is a well-known technique in lithographic patterning. Reply 16–17 (citing Ex. 1017, 64:11–21).

Regarding the additional steps argument, the claim language employs the term “comprising,” meaning that other steps or elements may be present in the claim. *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997); Tr. 21:7–17.

The specification of the ’084 patent provides: “Any suitable lithographic patterning technique may be used and may depend, for example, on the material used for” the imaging layer. Ex. 1001, 6:14–16. The specification and claims together, therefore, allow for alternate, known techniques of lithographic patterning, such as shifting a wafer relative to a mask. Reply 16; Jinbo 5. Patent Owner’s expert, Dr. Mack, agreed that both aligning and shifting a mask relative to a wafer were standard in the industry at the time of the ’084 patent. Reply 16–17 (citing Ex. 1017, 64:11–21).

In sum, the parties, the district court, and this panel all appear to agree that the “claim terms ‘a first pattern’ and ‘a second pattern’ must be interpreted as two separate individual elements,” meaning they are separate, i.e., not “one and the same.” We are not persuaded, however, to construe the second pattern as a *geometric* pattern that is “different” from the first pattern, or as “not a duplicate of the first pattern.” See *Free Motion Fitness, supra*.

The specification provides: “The second mask may include *any suitable pattern* of opaque and clear features that may depend, for example, on the desired pattern to be formed in imaging layer 240.” Ex. 1001, 6:23–25 (emphasis added). We note that the second pattern must be “suitable,” in that the claims require that the second imaging layer be patterned in accordance with a second pattern “to form a second patterned layer having a

second feature (distinct from the first feature).” If use of the second pattern did not result in a second patterned layer having a second feature, it would not be suitable. The second pattern nevertheless may be *different* from the first pattern, i.e. it may be a separate element, in certain aspects, such as the order in which it is used (claims 1, 15) and its use to generate a second feature (Ex. 1001, Figs. 5, 11, 16). The geometry of the second pattern, however, is not necessarily different from the first pattern. *See, e.g.*, Figs. 7–11, 13–16. Thus, the second pattern is a separate element, but need not be further defined as Patent Owner urges.

Accordingly, we construe the term “second pattern” as “any suitable pattern in accordance with which the second imaging layer is selectively irradiated.”

2. Additional Claim Terms

In the Decision to Institute, we also construed the term “stabilizing” as “performing any process that renders a material able to withstand subsequent lithographic processing steps,” and the term “a second feature distinct from the first feature” as “a second feature that is a separate element from the first feature.” Dec. 6–9. The parties did not address these constructions in the Patent Owner Response and Petitioner’s Reply. Based on the complete record now before us, we see no reason to alter our earlier constructions, and maintain the constructions for this Final Written Decision.

B. Anticipation by Jinbo

We have reviewed the Petition, the Patent Owner Response, and Petitioner’s Reply, as well as the evidence presented by both parties in support of their arguments.

1. *Jinbo*

Jinbo discloses “a pattern forming method used in the process of manufacturing semiconductor devices or the like.” Ex. 1004, 2. Jinbo states that a first resist pattern and a second resist pattern are arranged in a prescribed relationship on a substrate (for example, a space of the second resist pattern is arranged in an area corresponding to a space section of the first resist pattern on the substrate) for forming resist patterns, and the patterns can become the final resist pattern. *Id.* at 3. Jinbo’s exemplary process includes forming a first resist on a substrate (*id.* at 4), using a mask having a line and space pattern to expose the first resist to exposure light to create a first resist pattern 13b (*id.* at 4–5), insolubilizing the first resist pattern (*id.* at 5), forming a second resist (*id.*), and using a mask to form a second resist pattern 15a (*id.*). Together the first resist pattern 13b and second resist pattern 15a form a resist pattern 17. *Id.*

Jinbo’s Figure E, reproduced below, illustrates an exemplary product of such a process:

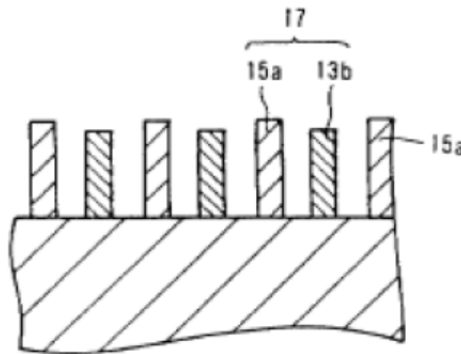


Figure E depicts the product of Jinbo after second resist developing. *Id.*

2. Arguments

Petitioner challenges claims 1–8, 12, 15, and 16 as anticipated under 35 U.S.C. § 102(b) by Jinbo. Pet. 18–29. Petitioner argues that Jinbo discloses every element of claim 1, relying *inter alia* on Jinbo Figures B, D, and E, and on the declaration of Richard A. Blanchard, Ph.D. Pet. 19–24, Ex. 1009. Petitioner also argues that Jinbo discloses every element of independent claim 15, referring to its claim 1 arguments. *Id.* at 28–29. With respect to claims 2–8, 12, and 16, Petitioner argues that Jinbo discloses each limitation of those dependent claims. *Id.* at 24–28, 29.

Patent Owner argues that Jinbo does not explicitly disclose the limitation of patterning the second imaging layer in accordance with a second pattern. PO Resp. 20. Patent Owner maintains that the '084 patent claims patterning two imaging layers “in accordance with *two separate patterns*, whereas Jinbo uses *a single pattern* and requires shifting the wafers between the patterning steps.” *Id.* at 21. Patent Owner interprets our finding that Jinbo reasonably supports a reading that “a mask” could be any suitable mask as “a testament to the fact that Jinbo does not *expressly* disclose a ‘second pattern.’” *Id.* at 22.

Patent Owner also argues that Jinbo does not inherently disclose a second pattern in accordance with which the second resist layer is patterned. *Id.* at 23. Patent Owner points to Jinbo’s technique of shifting the wafer stage so that the spaces of the mask will be projected on the spaces of first resist pattern 13b as illustrating that the “second pattern” limitation is not necessarily present in Jinbo. *Id.*

Petitioner responds that, even if Jinbo uses the same mask in both patterning steps, “the use of the same mask in the second patterning step

does not mean that the second imaging layer is irradiated with the same ‘pattern.’” Reply 18. In other words, Petitioner argues, “‘pattern’ in the claims is not synonymous with mask.” *Id.* Petitioner thus argues that “Jinbo teaches patterning a first imaging (resist) layer using a first pattern and separately patterning a second imaging (resist) layer using a second pattern.” Reply 22. Regarding pattern placement and pattern timing, Petitioner notes that Patent Owner’s expert, Dr. Mack, agreed that “a pattern that’s placed in a different position is a different pattern” and that Jinbo has a second patterning step that occurs later in time than the first patterning step.” *Id.* at 20–21 (citing Ex. 1017, 60:2–15; 84:24–85:3). Regardless of which claim construction we adopt, Petitioner argues, Jinbo still teaches the “second pattern” claim element, because “Jinbo clearly teaches that the patterns being exposed on the first and second resists are indeed different” and “Jinbo teaches that the second pattern is different from the first pattern in the order in which it is formed.” *Id.* at 22.

We construe the claim term “second pattern” as “any suitable pattern in accordance with which the second imaging layer is selectively irradiated,” as discussed above. Jinbo selectively irradiates a second imaging layer, resulting in a second patterned layer having a second feature distinct from the first feature (claim 1) or a second feature, where the first and second features do not overlap (claims 15, 16). Ex. 1004, 4–5. Jinbo teaches a second patterned layer, and thus, a suitable pattern, i.e. a second pattern, that was used to make the second patterned layer. *Id.* As in the claims, Jinbo’s second pattern is used after the first pattern, and use of the second pattern results in a second patterned layer having a second feature distinct from the first feature. Jinbo creates features 13b using a first pattern, and then creates

distinct, non-overlapping features 15a using a second pattern. *Id.* Under our claim construction, therefore, Jinbo discloses a second pattern.

The parties have not offered any proposed constructions for the term “mask.” We note that the term “mask” appears in two claims, claim 6: “The method of claim 1, wherein the patterning step (b) includes the step of exposing a portion of the first imaging layer to radiation through a mask,” and in claim 7: “The method of claim 1, wherein the patterning step (e) includes the step of exposing a portion of the second imaging layer to radiation through a mask.” Those claims do not recite “first mask” or “second mask,” but rather “a mask.”

“The doctrine of claim differentiation ‘create[s] a presumption that each claim in a patent has a different scope.’ The difference in meaning and scope between claims is presumed to be significant ‘[t]o the extent that the absence of such difference in meaning and scope would make a claim superfluous.’” *Free Motion Fitness*, 423 F.3d at 1351 (citations omitted). Patent Owner does not address directly Petitioner’s assertions that Jinbo anticipates claims 6 and 7. Based upon our review, the use of the term “a mask” in claims 6 and 7 supports Petitioner’s argument that “pattern is not synonymous with mask.” In addition, whether Jinbo discloses a single mask, or multiple masks, does not affect our analysis relative to Jinbo’s disclosure of a second pattern. Jinbo’s disclosure of a mask, or multiple masks, discloses “a mask,” as recited in claims 6 and 7.

Patent Owner argues that the ’084 patent “could be a single mask having multiple patterns and then the mask might be shifted to expose a different pattern, but that is not what’s taught in Jinbo.” Tr. 37:8–12. Patent Owner instead argues that Jinbo shifts the wafer stage to create its second

patterned layer, and thus does not have a “second pattern,” but rather, “the exact same pattern.” *Id.* at 37:23. We are not persuaded.

The claims and the specification allow broadly for any suitable lithographic technique, including shifting the wafer stage, so Jinbo’s technique is consistent with those claim elements. Jinbo creates a first patterned layer, and then creates a second patterned layer with features distinct from those of the first patterned layer. Ex. 1004, 4–5. In order to do so, it uses a pattern that effects this result, notwithstanding the mask used. That pattern is a separate element in time and in space, and therefore, is a second pattern that is not the exact same pattern as the first pattern.

Notwithstanding Patent Owner’s argument and cited evidence, we are persuaded by Petitioner’s argument and supporting evidence that Jinbo expressly discloses both a first pattern and a second pattern.

We also have reviewed the arguments presented in the Petition and the supporting evidence regarding the anticipation of the remaining elements of claims 1–8, 12, 15, and 16, which were not expressly disputed by Patent Owner in its Response. Patent Owner has not rebutted Petitioner’s showing that Jinbo discloses a second pattern, nor Petitioner’s showing regarding anticipation by Jinbo of the remaining elements of the independent and dependent claims challenged in this ground. We find that Petitioner has established, by a preponderance of the evidence, that Jinbo anticipates claims 1–8, 12, 15, and 16.

C. Obviousness Based on Jinbo and McColgin

Petitioner challenges claim 9 as unpatentable under 35 U.S.C. § 103 over Jinbo in view of McColgin. Pet. 32–34. Claim 9 further limits the stabilizing step of claim 1 with the language “wherein the stabilizing step (c)

includes the step of using a silylation technique to stabilize the first patterned layer.” Pet. 32. We instituted *inter partes* review on this ground. Dec. 14.

McColgin teaches a silylation technique that produces resist patterns “which have excellent etch resistance and superior thermal and dimensional stability.” Ex. 1006, 2:9–12. Petitioner argues that substitution the silylation stabilization of McColgin for the plasma stabilization of Jinbo “would merely be the simple substitution of known elements to obtain predictable results.” Pet. 33. More specifically, Petitioner points to the “direct motivation from Jinbo,” i.e. teaching a desire to make the first resist layer “insoluble” (Ex. 1004, 5) and encouraging use of different treatment methods for making the resist insoluble (*id.* at 6). Pet. 33.

Patent Owner argues that claim 9 cannot be obvious because Jinbo does not disclose several material limitations of claim 1, from which claim 9 depends. PO Resp. 25. Patent Owner alleges that “Petitioners failed to address the deficiencies of their challenge of claim 1,” and the challenge to claim 9 fails at least for this reason. *Id.*

We have reviewed the Petition, the Patent Owner Response, and evidence in support of each party’s arguments. As previously discussed, we are persuaded that Petitioner has demonstrated, by a preponderance of the evidence, that Jinbo discloses every element of the independent claims. After reviewing of the arguments and evidence presented concerning dependent claim 9, we find a preponderance of the evidence establishes that Jinbo in combination with McColgin teaches each and every limitation of dependent claim 9.

D. Obviousness Based on Jinbo and Matthews

Petitioner challenges claims 10 and 11 as unpatentable under 35 U.S.C. § 103 over Jinbo in view of Matthews. Pet. 34–37. Claim 10 further limits the stabilizing step (c) of claim 1 to include “exposing the first patterned layer to radiation and heating the first patterned layer.” Claim 11 further limits the stabilizing step (c) of claim 1 to include “exposing the first patterned layer to radiation having a wavelength in a range from approximately 200 nanometers to approximately 400 nanometers, and heating the first patterned layer at a temperature ramped to approximately 230 degrees Celsius.” We instituted *inter partes* review on this ground. Dec. 16.

Matthews teaches a technique that is capable of “hardening a positive photoresist by exposing a film of photoresist material to UV radiation while subjecting the film to elevated temperatures.” Ex. 1007, 2:53–58. In this capacity, Petitioner contends that Matthews describes using radiation “having wavelengths about 320 nm and below to cause the polymer to cross-link.” Pet. 36 (citing Ex. 1007, 3:57–61). In addition, Petitioner contends that Matthews discloses that “the temperature of the photoresist is controlled during the exposure to radiation,” and that a “typical [temperature] range therefor being about 100°–200°C. and more usually, about 120° to about 200° C.” Pet. 36–37 (citing Ex. 1007, 4:52–57; 5:8–12). Petitioner argues that substitution of the hardening process of Matthews for the plasma stabilization of Jinbo “would merely be the simple substitution of known elements to obtain predictable results.” Pet. 35. Specifically, Petitioner points to the “direct motivation from Jinbo,” i.e. teaching a desire to make the first resist layer “insoluble” (Ex. 1004, 5) and encouraging use of

different treatment methods for making the resist insoluble (*id.* at 6). Pet. 35.

Patent Owner argues that claims 10 and 11 cannot be obvious because Jinbo does not disclose all limitations of claim 1. PO Resp. 25. Patent Owner alleges that “Matthews does not cure deficiencies of Jinbo,” and thus the challenge to claims 10 and 11 fails at least for the same reasons as the challenge to Jinbo. *Id.*

We have reviewed the Petition, the Patent Owner Response, and evidence in support of each party’s arguments. As previously discussed, we are persuaded that Petitioner has demonstrated, by a preponderance of the evidence, that Jinbo discloses every element of the independent claims. After reviewing of the arguments and evidence presented concerning dependent claims 10 and 11, we find a preponderance of the evidence establishes that Jinbo in combination with Matthews teaches each and every limitation of dependent claims 10 and 11.

III. SUMMARY

Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–12, 15, and 16 of the ’084 patent are unpatentable. This is a Final Written Decision of the Board under 35 U.S.C. § 318(a).

IV. ORDER

For the reasons given, it is

FURTHER ORDERED that claims 1–12, 15, and 16 of the ’084 patent are *unpatentable*; and

FURTHER ORDERED that parties to the proceeding seeking judicial review of this final written decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2014-01030
Patent 5,652,084

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