

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SOLUS ADVANCED MATERIALS CO., LTD.,
Petitioner,

v.

SK NEXILIS CO., LTD.,
Patent Owner.

IPR2024-01461
Patent 10,811,689 B2

Before JOHN G. NEW, JO-ANNE M. KOKOSKI, and
JON B. TORNQUIST, *Administrative Patent Judges*.

KOKOSKI, *Administrative Patent Judge*.

DECISION

Denying Petitioner's Request for Rehearing of
Decision Denying Institution of *Inter Partes* Review
37 C.F.R. § 42.71(d)

I. INTRODUCTION

Solus Advanced Materials Co., Ltd. (“Petitioner”) filed a Request for Rehearing of our Decision (Paper 14, “Dec” or “Decision”) denying institution of *inter partes* review of claims 1–10 (“the challenged claims”) of U.S. Patent No. 10,811,689 B2 (“the ’689 patent,” Ex. 1001). Paper 14 (“Request” or “Req.”). The Request challenges our determination that the information presented in the Petition did not establish a reasonable likelihood of showing that claims 1–10 would have been obvious over the combined teachings of Shinozaki,¹ Khatibi,² Toshio,³ and Kim,⁴ or the combined teachings of Kim, Khatibi, and Griesi.⁵ Dec. 15–24. For the reasons that follow, Petitioner’s request is denied.

II. STANDARD OF REVIEW

When rehearing a decision on institution, we do not review the merits of the decision *de novo*, but instead review the decision for an abuse of discretion. 37 C.F.R. § 42.71(c). An abuse of discretion may be determined “if a decision is based on an erroneous interpretation of law, if a factual finding is not supported by substantial evidence, or if the decision represents an unreasonable judgment in weighing relevant factors.” *Arnold Partnership v. Dudas*, 362 F.3d 1338, 1340 (Fed. Cir. 2004) (citing *In re*

¹ US 2013/0108922 A1, published May 2, 2013 (Ex. 1004, “Shinozaki”).

² G. Khatibi, *Temperature Dependent Elastic and Thermal Properties of Thin Copper Foils*, Copper; Proceedings of the International Conference Copper ’06 (2006) (Ex. 1006, “Khatibi”).

³ Korean Patent Pub. No. 10-2012-0003485, published Jan. 10, 2012 (Ex. 1013; Ex. 1014 (English translation), “Toshio”).

⁴ US 2013/0108887 A1, published May 2, 2013 (Ex. 1012, “Kim”).

⁵ Griesi, M.B., *Characterization of Electrodeposited Copper Foil Surface Roughness for Accurate Conductor Power Loss Modeling* (2014) (Master’s Thesis, University of South Carolina) (Ex. 1015, “Griesi”).

Gartside, 203 F.3d 1305, 1315–16 (Fed. Cir. 2000)). The party requesting rehearing has the burden to show that the decision should be modified. 37 C.F.R. § 42.71(d). Additionally, the request for rehearing “must specifically identify all matters the party believes the Board misapprehended or overlooked, and the place where each matter was previously addressed in a motion, an opposition, or a reply.” *Id.*

III. ANALYSIS

In the Request, Petitioner asserts that we misapprehended or overlooked (1) Khatibi’s disclosure, and Petitioner’s evidence and explanation thereof, with respect to limitation [1d]; (2) Shinozaki’s teachings, and Petitioner’s evidence and explanation thereof, with respect to limitation [1e]; and (3) Petitioner’s evidence regarding Griesi’s disclosures with respect to limitation [1g]. Req. 1. We reviewed Petitioner’s Request and carefully considered the arguments presented. For the following reasons, we are not persuaded that we abused our discretion in denying institution of an *inter partes* review of claims 1–10 of the ’689 patent.

A. Limitation [1d]

Limitation [1d] recites “a coefficient of thermal expansion of the electrolytic copper foil, which is measured using a thermomechanical analyzer (TMA) while heating the electrolytic copper foil from 30° C. to 190° C. at a speed of 5° C./min, ranges from 16 to 22 $\mu\text{m}/(\text{m}\cdot^{\circ}\text{C}.)$.” Ex. 1001, 13:52–56. In the Decision, we found that Petitioner’s argument that Khatibi’s disclosures meet this limitation “are based solely on Dr. Randall’s testimony that Khatibi’s measurement method would produce results that would not significantly differ from results determined using the claimed method,” and Dr. Randall’s testimony “is largely conclusory and unsupported by adequate explanation and/or objective evidence.” Dec. 17–

18. In the Request, Petitioner argues that we “overlooked the four pages of detailed analysis provided by Dr. Randall” that “thoroughly explained and provided support for why the measurement details of [1d] do not warrant patentable weight.” Req. 1 (citing Ex. 1003 ¶¶ 57–60); *see also id.* at 5 (“Dr. Randall explained and provided support for why such measurement details should not be given patentable weight, especially in view of Khatibi’s comprehensive disclosure regarding” the coefficient of thermal expansion.).

We disagree that we overlooked Dr. Randall’s testimony. Instead, we specifically discussed Dr. Randall’s testimony and explained why it was deficient:

For example, Dr. Randall does not provide adequate explanation or objective evidence to support his opinion that Khatibi’s use of a laser speckle based dilatometer instead of the claimed thermomechanical analyzer “is unlikely to significantly impact the CTE^[6] value” because “variations in equipment and a heating speed of 5° C/min would not significantly alter the results.” Ex. 1003 ¶ 58. In particular, Dr. Randall neither explains what constitutes a “significant” impact on CTE, nor provides objective evidence to support his contention that equipment variations and heating differences would not “significantly alter” the resulting measurements. And although Dr. Randall opines that “the heating rate (5°C per minute) is *typical* for certain devices” such as a thermomechanical analyzer or dilatometer, and “[t]ypically, these devices use temperature ramp rates between 2°C and 20°C per minutes, so the ‘5° C./min’ recited in [1d] is common and should not drastically affect the measurement results,” Dr. Randall fails to point us to any evidence showing that these temperatures are “typical” or that the claimed heating rate is “common.” *Id.* ¶ 59 (emphases added).

⁶ CTE is the coefficient of thermal expansion. Paper 2, 8.

Dec. 17. Thus, we considered Dr. Randall’s testimony and concluded that it was insufficiently supported by evidence of record to sustain his assertion that limitation [1d]’s requirement that the coefficient of thermal expansion be measured using a thermomechanical analyzer “is unlikely to significantly impact the CTE value.” Ex. 1003 ¶ 58.

It was Petitioner’s burden to establish the Khatibi, alone or in combination with Shinozaki, Toshio, and Kim, discloses limitation [1d]. We concluded that Petitioner failed to meet that burden for the reasons explained in our Decision. We are not persuaded that we overlooked or misapprehended Khatibi’s disclosures, or Petitioner’s evidence and explanation thereof, in doing so.⁷

B. Limitation [1e]

Limitation [1e] recites “a tensile strength of the electrolytic copper foil, which is measured after a heat treatment at a temperature of 190° C. for 1 hour, ranges from 21 to 36 kgf/mm².” Ex. 1001, 13:57–59. In the Decision, we found that Petitioner’s argument that Shinozaki’s disclosures meet this limitation was based on Dr. Randall’s testimony that heating at 190° C. for 1 hour (as set forth in limitation [1e]) would insignificantly effect the tensile strength values reported in Shinozaki after heating at a temperature of 150° C. for 15 hours, and Dr. Randall’s testimony is conclusory and insufficiently supported by objective evidence and/or

⁷ Petitioner also argues that “the fact that Khatibi’s electrodeposited copper foil has substantially the same range of CTE . . . as recited in the claims should be enough to establish a prima facie case of obviousness.” Req. 5–6. Petitioner, however, does not direct us to where Petitioner made this argument in the Petition. A request for rehearing is not an opportunity to supplement a petition and make arguments a party did not make earlier. 37 C.F.R. § 42.71(d).

adequate explanation. Dec. 19–20. In the Request, Petitioner argues that we “overlooked evidence provided in the Petition that ties the 15-hour heat treatment of Shinozaki to the high temperature heat treatment of Sano.”^[8] Req. 6 (citing Pet. 18–19; Ex. 1003 ¶ 61; Ex. 1008, Table 2). Petitioner also argues that we overlooked Dr. Randall’s explanation that such measurement details should not be given patentable weight. *Id.* at 6–7 (citing Ex. 1003 ¶ 61).

Petitioner’s arguments are not persuasive. In the Decision, we discussed Sano and Dr. Randall’s testimony in explaining why Petitioner’s showing was deficient:

Dr. Randall’s testimony with respect to Shinozaki’s tensile strength suffers from the same deficiencies as his testimony with respect to CTE discussed above. For example, Dr. Randall testifies that “a heating temperature of 190° C. for 1 hour would have had insignificant effect on changes on tensile strength,” but does not provide adequate explanation or objective evidence to support this contention. Ex. 1003 ¶ 61. Dr. Randall does point to Sano, and testifies that “the majority (12 out of 17) of the high temperature (180°C) tensile strength (*e.g.*, “Expansive force”) data for the copper foils disclosed fall within the range of 21 to 36 kgf/mm² as well.” *Id.* (citing Ex. 1008, Table 2). Dr. Randall identifies the temperature at which Sano’s tensile strength (called Expansive force) was measured, but does not identify the amount of time the copper foil was treated at that temperature or provide any objective evidence to support the conclusion that the length of time and temperature of the heat treatment would have had an insignificant effect on the reported tensile strengths. Thus, Dr. Randall’s testimony that the claimed heating temperature and time duration would insignificantly effect tensile strength is

⁸ U.S. Patent App. Pub. No. US 2006/0191798, issued Aug. 31, 2006 (“Sano,” Ex. 1008).

conclusory and insufficiently supported, and we give it little weight.

Dec. 19–20 (footnotes and citations omitted). Thus, we considered Sano, and Dr. Randall’s testimony, and determined that it was insufficient to establish a reasonable likelihood of showing that Shinozaki, alone or in combination with Khatibi, Toshio, and Kim, discloses limitation [1e]. We are not persuaded that we abused our discretion in doing so.⁹

C. Limitation [1g]

Limitation [1g] recites “a peak count (Pc) of each of the first and second surfaces of the electrolytic copper foil ranges from 3 to 92.” Ex. 1001, 13:62–63. In the Decision, we determined that “Griesi’s Pc value appears to be an incidental finding, which is not discussed or analyzed in the reference,” and “Petitioner does not persuasively explain why such an incidental, unexamined finding would lead a POSITA to import Griesi’s Pc value into Kim’s copper foil, absent a hindsight desire to reconstruct the claimed invention.” Dec. 23–24 (citing Ex. 1015, 53–56). In the Request, Petitioner argues that we misapprehended Petitioner’s argument that “explained why a POSITA could and would have incorporated Griesi’s Rpc teachings into Kim, based not on hindsight but rather independent teachings of third party reference disclosures that further corroborate the expert testimony from Dr. Randall.” Req. 3 (citing Pet. 58–61); *see also id.* at 8

⁹ Petitioner also argues that “[w]here the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of obviousness is established.” Req. 7. Petitioner does not direct us to where Petitioner made this argument in the Petition. We could not have overlooked or misapprehended an argument presented for the first time in the Request.

(“[T]he Petition’s reliance on Dr. Randall’s testimony and related corroborating evidence to support the combination does not amount to impermissible hindsight, as that testimony ‘takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned only from applicant’s disclosure.’” (citing *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971))).

We disagree that we misapprehended Petitioner’s arguments. In the Petition, Petitioner contends that “prior art and generally known knowledge suggest that achieving values within the claimed range (Pc of 3–92) would be straightforward, in which the viability and possibility of such values are evidenced at least by Griesi” and “the specific Rpc (or Pc) value of 19.2 disclosed in Griesi is a relevant disclosure for the recited range of Pc values.” Pet. 68 (citing Ex. 1003 ¶¶ 185, 187; Ex. 1015, Fig. 3.16) (emphasis omitted). Petitioner also contends that a POSITA would have recognized Griesi’s reported Pc value “as a potentially useful parameter that can be optimized to further enhance uniformity or generally improve Kim’s copper foil surface, for example, to prevent wrinkles or achieve other advantageous effects.” *Id.* at 59 (citing Ex. 1003 ¶ 159).

Petitioner, however, does not adequately explain why a POSITA would have been motivated to modify Kim’s copper foil surface to have a Pc value of 19.2 as reported in Griesi. In particular, neither Petitioner nor Dr. Randall points us to, nor do we discern, any teaching in Griesi that a peak count of 19.2 provides any particular benefits or properties that would have lead a POSITA to modify Kim’s copper foil surface as Petitioner proposes. Instead, Petitioner’s arguments that a POSITA would have been motivated to modify Kim’s copper foil surface with Griesi’s peak count

value of 19.2 appear to be premised on Petitioner's knowledge of the '689 patent itself. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (stating that the fact finder must be aware "of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning").

It was Petitioner's burden to establish that the combined teachings Kim and Griesi disclose limitation [1g] as proposed. We are not persuaded that we misapprehended Petitioner's argument when we determined that Petitioner did not meet that burden.

IV. CONCLUSION

After reviewing and considering the arguments in Petitioner's Request, we conclude that Petitioner does not carry its burden of demonstrating that we misapprehended or overlooked any matters, and therefore abused our discretion, in denying institution of *inter partes* review of the challenged claims of the '689 patent. 37 C.F.R. § 42.71(d).

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner's Request for Rehearing is *denied*.

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