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Paper 9
Date: May 6, 2025

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MUNDRA SOLAR PV LTD. and ADANI SOLAR USA INC.,
Petitioner,

v.

TRINA SOLAR CO., LTD.,
Patent Owner.

IPR2025-00187
Patent 10,230,009 B2

Before SHERIDAN K. SNEDDEN, AVELYN M. ROSS, and DEBRA L. DENNETT, *Administrative Patent Judges*.

DENNETT, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314
Granting Motion for Joinder
35 U.S.C. § 315(c); 37 C.F.R. § 42.112(b)

I. INTRODUCTION

Mundra Solar PV Ltd. and Adani Solar USA Inc. (collectively "Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1–17 of U.S. Patent No. 10,230,009 B2 (Ex. 1001, "the '009 patent"). Trina Solar Co., Ltd. ("Patent Owner") filed a Preliminary Response to the Petition. Paper 8 ("Prelim. Resp.").

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314 (2012); 37 C.F.R. § 42.4(a). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted "unless the Director determines . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least [one] of the claims challenged in the petition."

For the reasons set forth below, upon considering the Petition, Preliminary Response, and evidence of record, we determine that Petitioner has established a reasonable likelihood of prevailing with respect to at least one challenged claim. Accordingly, we grant the Petition and institute an *inter partes* review.

A. Real Parties-in-Interest

Petitioner identifies Mundra Solar PV Ltd. and Adani Solar USA Inc. as the real parties-in-interest. Pet. 2.

Patent Owner identifies itself as the real party-in-interest. Paper 6, 1.

B. Related Proceedings

The parties identify the following legal proceedings as involving the '009 patent:

> *Trina Solar (US), Inc. et al., Ltd. v. Runergy USA Inc. and Runergy Alabama Inc.*, 1:24-cv-00557 (D. Del.); and
>
> *Trina Solar Co., Ltd. v. Jiangsu Runergy New Energy Technology Co., Ltd.*, 2:24-cv-07694 (C.D. Cal.);
>
> *Trina Solar Co., Ltd. v. Canadian Solar (USA) Inc., et al.*, 1:24-cv-01115 (D. Del.); and

Pet. 2–3; Paper 6, 1.

Petitioner also identifies the following legal proceeding as involving the '009 patent:

> *Certain TOPCon Solar Cells, Modules, Panels, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-1422 (filed Sept. 30, 2024).

Pet. 3; Paper 6, 1.

Petitioner further identifies IPR2025-00186, relating to U.S. Patent No. 9,722,104, as a related matter. *Id.*

C. The '009 patent

The '009 patent, titled "Solar Cell and Method for Manufacturing the Same," issued on March 12, 2019. Ex. 1001, codes (45), (54). The '009 patent describes a solar cell as an alternative energy source that generates electric power from solar energy. *Id.* 1:28–29. A solar cell "includes substrates made of semiconductors having different conductive types, such as a p type and an n type, a second conductive type semiconductor region (or emitter layer), and electrodes respectively connected to the substrates and the second conductive type semiconductor region." (*Id.*, 1:33-8). A "p-n junction is formed at the interface of the substrate and the second conductive type semiconductor region." (*Id.* 1:38-40). When light strikes the solar cell, "a plurality of electron-hole pairs are generated from the semiconductors." (*Id.*, 1:41-42). The electrons and holes move toward the n type and p type semiconductor regions, respectively, and are collected by

electrodes electrically connected to the substrates and the second conductive type semiconductor region. (*Id.* 1:42-50). "The electrodes are connected by lines, thereby obtaining power." (*Id.* 1:50-51).

Figure 2 of the '009 patent is reproduced below.

FIG. 2

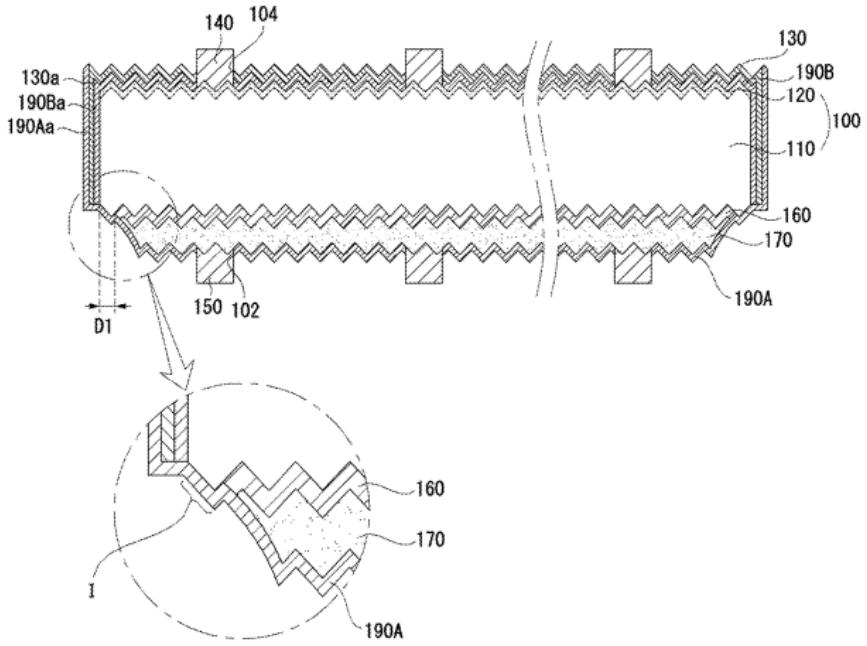


Figure 2 shows the entire cross-sectional view of a solar cell of an embodiment of the invention. The substrate 100 includes a base region 110 doped with impurities ("dopants") of a first or second conductive type at a low doping concentration. Ex. 1001, 7:33–36. On the back surface of the substrate (bottom side in Figure 2), a tunnel layer 160 may be formed, and the first conductive type semiconductor region 170 (having the same conductive type as the substrate) may be formed on the tunnel layer. *Id.* 7:44-50. "[T]he tunnel layer 160 may function as a kind of barrier for electrons and holes," and may include oxides. *Id.* 7:47–53, 62–64. If the base region 110 has the first conductive type, the first conductive type semiconductor region 170 may form a back surface filed (BSF) region, which

has a higher doping concentration than the semiconductor substrate 100. *Id.* 10:13–18. The second conductive type semiconductor region 120, having a conductive type different from that of the base region may form an emitter region, forming a pn junction along with the base region. *Id.*, 10:18–22. Passivation films 190A and 190B are formed on the first and second conductor regions 170 and 120, other than opening portions 102 and 104, corresponding to the first and second electrodes 150 and 140. *Id.*, 10:63–67.

The solar cell has an "isolation portion I" (shown magnified in Figure 2's inset) formed by removing the tunnel layer 160 placed on one side of the semiconductor substrate and an edge portion of the first conductive type semiconductor region 170. Ex. 1001, 4:40–43. Also as shown in the inset, the first passivation film 190A may cover the first surface of the semiconductor substrate along with the isolation portion, and also as the white space along the solar cell's periphery in Figure 3. The isolation portion I may block a short circuit between the first conductive type semiconductor region 170 and the second conductive type semiconductor region 120 that may have resulted when "impurities of the second conductive type may be diffused into the side of or the edge of the back surface of the semiconductor substrate 100." *Id.*, 13:20–39.

D. Illustrative Claim

Petitioner challenges claims 1–17 of the '009 patent. Independent claim 1 is representative of the challenged claims and is reproduced below with Petitioner's annotations[1]:

[1] For convenience, we adopt Petitioner's annotated claim format.

[1.a] A solar cell comprising:

[1.b] a silicon semiconductor substrate having a first conductive type;

[1.c] an oxide layer on a first surface of the silicon semiconductor substrate;

[1.d] a polysilicon layer on the oxide layer and having the first conductive type;

[1.e] an emitter region at a second surface of the silicon semiconductor substrate opposite to the first surface and having a second conductive type opposite to the first conductive type;

[1.f] a first passivation film on the polysilicon layer;

[1.g] a first electrode connected to the polysilicon layer through an opening formed in the first passivation layer;

[1.h] a second passivation film on the emitter region;

[1.i] a second electrode connected to the emitter region through an opening formed in the second passivation film; and

[1.j] an isolation portion for preventing a contact between the polysilicon layer and the emitter region, wherein the isolation portion excludes the oxide layer and the polysilicon layer, and is in an edge portion of the first surface of the silicon semiconductor substrate; and

[1.k] the first passivation film covers the first surface of the silicon semiconductor substrate and the isolation portion together.

Ex. 1001, 37:65–38:26.

E. The Asserted Unpatentability Challenges

Petitioner asserts that claims 1–17 would have been unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–8, 11–13, 15, 17	103	Jin,[2] Feldmann[3]

[2] US 2013/0056051 A1, published Mar. 7, 2013 (Ex. 1009, "Jin").

[3] F. Feldmann et al., *Passivated rear contacts for high-efficiency n-type Si solar cells providing high interface passivation quality and excellent transport*

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
16	103	Jin, Feldmann, Chang[4]
1–8, 11–13, 15–17	103	Chang, Jin
9, 10	103	Jin, Feldmann, Seo[5]
9, 10	103	Chang, Jin, Seo
14	103	Jin, Feldmann, Watabe[6]
14	103	Chang, Jin, Watabe

Pet. 3–4. Petitioner also relies on declaration testimony of Dr. Sanjay Banerjee (Ex. 1003).

II. ANALYSIS

A. Principles of Law

In an *inter partes* review, "the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). This burden of persuasion never shifts to the patent owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

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characteristics, Solar Energy Materials & Solar Cells, Vol. 120, pp. 270–274 (Ex. 1012, "Feldmann").

[4] US 2014/0299187 A1, published Oct. 9, 2014 (Ex. 1013, "Chang").

[5] US 8,647,914 B2, issued Feb. 11, 2014 (Ex. 1015, "Seo").

[6] JP 2010-186862 A, published Aug. 26, 2010 (Ex. 1014, "Watabe").

Obviousness is a question of law based on underlying determinations of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966); *Richardson-Vicks, Inc. v. Upjohn Co.*, 122 F.3d 1476, 1479 (Fed. Cir. 1997). A claim is unpatentable as obvious, under 35 U.S.C. § 103, if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). 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) objective evidence of nonobviousness.[7] *Graham*, 383 U.S. at 17–18. Consideration of the Graham factors "helps inform the ultimate obviousness determination." *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1048 (Fed. Cir. 2016) (en banc), cert. denied, 138 S. Ct. 420 (2017). Subsumed within the Graham factors are the requirements that all claim limitations be found in the prior art references and that the skilled artisan would have had a reasonable expectation of success in combining the prior art references to achieve the claimed invention. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007). "Obviousness does not require absolute predictability of success . . . all that is required is a reasonable expectation of success." *In re O'Farrell*, 853 F.2d 894, 903–04 (Fed. Cir. 1988) (citations omitted). But, a petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

[7] Petitioner asserts that the objective factors in the record support a conclusion of obviousness. Pet. 90–91. Patent Owner, at this time, does not address objective indicia of nonobviousness. *See generally* Prelim. Resp.

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 17.

Petitioner contends that a person of ordinary skill in the art

> would have been someone with an advanced degree involving the disciplines of electrical engineering, applied physics, chemistry, or materials science, and at least two years of experience designing, developing, or researching in the field. Alternatively, that person would have had a bachelor's degree in electrical engineering, applied physics, or materials science, and at least three years of experience designing, developing, or researching in the field.

Pet. 4–5 (citing Ex. 1003 ¶ 49).

Patent Owner does not address the level of ordinary skill in the art at this stage of the proceeding. *See generally* Prelim. Resp.

In light of the record before us, and for purposes of this Decision, we adopt Petitioner's proposal regarding the level of ordinary skill in the art. Based on our review of the '009 patent and the prior art of record, we determine that the definition offered by Petitioner comports with the qualifications a person would have needed to understand the '009 patent and the prior art. We will make any final determination pertaining to the level of ordinary skill in the art, however, on the full trial record.

C. Claim Construction

We construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc); 37 C.F.R. § 42.100(b). Under *Phillips*, we give claim terms "their ordinary and customary meaning." *Phillips*, 415 F.3d at 1312. "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill

in the art in question at the time of the invention." *Id.* at 1313. "Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

Petitioner contends that "[n]o claim construction is believed to be necessary to resolve this Petition." Pet. 25. And, Patent Owner does not address claim construction at this stage of the proceeding. *See generally* Prelim. Resp.

For purposes of this Decision, we need not expressly construe any claim terms. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that "only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy"); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

D. Institution of Inter Partes Review

Petitioner contends that the Petition is substantially the same as the petition on which we instituted review in IPR2025-00006. Mot. for Joinder 3–4. In particular, Petitioner contends that "the concurrently filed Petition involves the same patent, relies on the same exhibits, and is based on identical grounds for the challenged claims, and includes the same combinations of prior art submitted in the Runergy IPR [i.e., IPR2025-00006]." *Id.* at 4. Petitioner explains that "there are no changes to the facts, citations, evidence, or arguments presented in the grounds for unpatentability set forth in the Runergy Petition," and because "the proceedings present identical grounds for the challenged claims, good cause [ ] for joining Petitioners as parties to the Runergy IPR and consolidating the proceedings." *Id.*

We instituted review of claims 1–17 of the '009 patent in IPR2025-00006 after a review of all arguments and evidence presented by the parties, including

Patent Owner's arguments in its preliminary response. For the reasons discussed in the Institution Decision in IPR2025-00006, we determine that Petitioner demonstrates a reasonable likelihood of showing at least one claim of the '009 patent is unpatentable. Thus, we find that the Petition warrants institution of *inter partes* review on all claims and grounds set forth in the Petition.

E. Motion for Joinder

Pursuant to 35 U.S.C. § 315(c),

> If the Director institutes an inter partes review, the Director, in his or her discretion, may join as a party to that inter partes review any person who properly files a petition under section 311 that the Director, after receiving a preliminary response under section 313 or the expiration of the time for filing such a response, determines warrants the institution of any inter partes review under section 314.

In considering a motion for joinder, and whether such joinder is appropriate, the Board may consider "whether a new ground of unpatentability is raised in the second petition, how the cost and schedule of the first proceeding will be impacted if joinder is granted, and whether granting joinder will add to the complexity of briefing and/or discovery." Patent Trial and Appeal Board Consolidated Trial Practice Guide November 2019[8] at 76 (citing *Kyocera Corp. v. SoftView LLC*, IPR2013-00004, Paper 15 at 4 (PTAB Apr. 24, 2013)).

Petitioner contends that no new grounds of unpatentability are raised in the Petition. Mot. for Joinder 3–4. Petitioner further agrees to an "understudy" role in which it will not seek additional depositions or deposition time, and "will assume the primary role only if Runergy ceases to participate in the Runergy IPR." *Id.* at 1, 5–6. And, argues that "[b]ecause . . . [the] Petition presents the identical grounds for the challenged claims and the same evidence, there are no new issues

[8] Available at https://www.uspto.gov/TrialPracticeGuideConsolidated.

for Patent Owner to address" and "joinder with the Runergy IPR will not unduly burden or negatively impact the schedule in that proceeding in any way." *Id.* at 5; *see also id.* at 6 ("briefing and discovery will be simplified because Patent Owner can maintain its current trial schedule and avoid duplicative efforts".

Patent Owner did not address joinder it its Preliminary Response to the Petition or file an opposition to Petitioner's Motion for Joinder.

Upon consideration of Petitioner's arguments, we are persuaded that it is appropriate under these circumstances to join Petitioner to the proceeding in IPR2025-00006. Petitioner's agreement to accept an "understudy" role and to not actively participate in IPR2025-00006 unless the current petitioner ceases to participate will limit any potential impact on the trial schedule and will avoid increasing the costs or complexity of the proceeding. Therefore, joinder of Petitioner to IPR2025-00187 will further the goals of a just, speedy, and inexpensive resolution of Petitioner's challenge. 37 C.F.R. § 42.1(b).

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail with respect to at least one of the claims challenged in the Petition. Accordingly, we order an *inter partes* review of the '009 patent and grant Petitioner's Motion for Joinder.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–17 of U.S. Patent No. 10,230,009 B2 is ordered with respect to all grounds set forth in the Petition;

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which will commence on the entry date of this Decision;

FURTHER ORDERED that Petitioner's Motion for Joinder with IPR2025-00006 is granted, and Petitioner is joined as a Petitioner in that proceeding;

FURTHER ORDERED that Petitioner's role in IPR2025-00006 is limited as set forth in Petitioner's Motion for Joinder unless and until the petitioner in that proceeding ceases to participate in IPR2025-00006;

FURTHER ORDERED that the Scheduling Order in IPR2025-00006 shall govern the schedule of the joined proceedings;

FURTHER ORDERED that all further filings shall be made in IPR2025-00006;

FURTHER ORDERED that the case caption in IPR2025-00006 shall be changed to reflect joinder of Mundra Solar PV Ltd. and Adani Solar USA Inc. as petitioners in accordance with the attached example (*see* below);

FURTHER ORDERED that a copy of this Decision shall be entered in the record of IPR2025-00006; and

FURTHER ORDERED that the instant proceeding is terminated under 37 C.F.R. § 42.72.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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IPR2025-00006
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[9] Mundra Solar PV Ltd. and Adani Solar USA Inc. were joined as petitioners in this proceeding based on a petition and motion for joinder filed in IPR2025-00187, which was granted.