

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

W.R. GRACE & CO.-CONN,
Petitioner,

v.

COCHISE TECHNOLOGY, LLC,
Patent Owner.

IPR2023-01063
Patent 11,224,864 B2

Before CHRISTOPHER M. KAISER, JEFFREY W. ABRAHAM, and
JANE E. INGLESE, *Administrative Patent Judges*.

INGLESE, *Administrative Patent Judge*.

DECISION

Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Overview

W.R. Grace & Co.-Conn (“the Petitioner”) filed a Petition (Paper 2, “Pet.”) for *inter partes* review of claims 1–22 (the “challenged claims”) of U.S. Patent No. 11,224,864 B2 (Ex. 1001, “the ’864 patent”). Cochise Technology, LLC (“the Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim Resp.”).

We have authority to determine whether to institute *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2022) (“The Board institutes the trial on behalf of the Director.”). *Inter partes* review may not be instituted “unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a).

Upon consideration of the information presented in the Petition and Preliminary Response, we determine that the Petitioner has not provided sufficient information to demonstrate a reasonable likelihood that at least one challenged claim is unpatentable. We therefore deny institution of *inter partes* review.

B. Real Parties in Interest

The Petitioner identifies itself, W.R. Grace & Co.-Conn, as the real party-in-interest. Pet. 74. The Patent Owner identifies itself, Cochise Technology, LLC, and G.W. Aru, LLC as the real parties in interest. Paper 5, 2.

C. Related Matters

The parties identify the following proceeding involving the '864 patent: *G.W. Aru, LLC et al. v. WR Grace & Co.-Conn.*, 1-22-cv-02636 (DMD). Pet. 74; Paper 5, 2. The Patent Owner indicates that the '864 patent is related to pending U.S. Patent Application No. 17/556,102, which is a division of U.S. Patent Application No. 17/176,222 ("the '222 application"), from which the '864 patent issued. Paper 5, 2.

II. BACKGROUND

A. The '864 patent (Ex. 1001)

The invention described in the '864 patent "is directed to a CO to CO₂ combustion promoter" for catalyzing combustion of CO produced during regeneration of catalyst particles in a fluid catalytic cracking ("FCC") unit. Ex. 1001, Abstr., 1:20–26, 2:17–25, 2:64–3:13, 3:61–4:2.

The '864 patent explains that fluid catalytic cracking involves contacting "higher boiling hydrocarbons" at high temperatures with fluidized particulate catalyst particles to "crack" the higher boiling hydrocarbons to "lower boiling hydrocarbons." *Id.* at 1:27–31. The catalyst used in this process "may be a crystalline zeolitic aluminosilicate component." *Id.* at 1:32–33. As the '864 patent explains, however, "combustible solids" (called "coke") produced during the cracking process deposit on the catalyst particles, adversely impacting the catalyst's activity and selectivity. *Id.* at 1:34–42, 3:61–65. To restore activity to the catalyst, the accumulated solids are burned off at temperatures exceeding 700°C in a "regenerator" of the FCC unit, which generates carbon monoxide (CO). *Id.* at 1:39–47, 3:7–8, 3:66–4:2. Due to the presence of oxygen in the

regenerator, the carbon monoxide is combusted to carbon dioxide, which is a highly exothermic process. *Id.* at 1:47–48. But if the CO is not completely combusted in the regenerator, it travels to other parts of the FCC unit, where it may react with oxygen to release heat, known as “carbon monoxide afterburning,” which “has caused significant damage to plant equipment.” *Id.* at 1:47–53.

Providing fluidized catalyst particles in the FCC regenerator that promote complete CO to CO₂ combustion (“CO to CO₂ combustion promoters”) prevents CO afterburning. *Id.* at 1:53–57. According to the ’864 patent, conventional processes for producing such CO to CO₂ combustion promoters involve impregnating porous microspheres having an average particle size of 60 to 90 microns with one or more Group VIII noble metals, such as platinum and/or palladium, to uniformly distribute “the Group VIII noble metal throughout the internal and external surfaces of the porous microsphere.” *Id.* at 1:62–2:3. The ’864 patent explains, however, that such conventional noble metal-based CO to CO₂ combustion promoters disadvantageously require “relatively large amounts of noble metal . . . to achieve the desired CO combustion in the FCC process.” *Id.* at 2:14–17.

The ’864 patent indicates that the inventors found that CO to CO₂ combustion promoters in which noble metal is distributed in the outer region of porous silica and/or alumina microspherical particles (an “eggshell” configuration) achieve the same combustion promoter activity as conventional CO to CO₂ combustion promoters having uniform distribution of noble metal throughout a porous support—despite including significantly less noble metal per particle. *Id.* at 2:17–32, 2:64–3:2. The ’864 patent explains that the inventors believe this effect occurred “because the CO to

CO₂ oxidation as catalyzed by a Group VIII noble metal is a very rapid, essentially instantaneous, reaction at the FCC regenerator temperatures of approximately 704° C (1,300° F) which is known as a diffusion limited or a mass-transfer limited reaction,” and, therefore, “the noble metal in the center of the particle is not active for CO to CO₂ oxidation as the reactant gases (CO and O₂) react before reaching this noble metal. *Id.* at 3:2–13.

B. Challenged Claims

The Petitioner challenges claims 1–22 of the ’864 patent (Pet. 1), of which claim 1 is the only independent claim (Ex. 1001, 14:46–16:42) and reads as follows:

1. A CO to CO₂ combustion promoter comprising microsphere sized porous particles, each microsphere sized porous particle having a diameter of less than 1 mm, and independently comprising:
 - silica, alumina, or mixtures thereof; and
 - one or more Group VIII noble metals distributed in the particle as an eggshell such that a higher concentration of the one or more Group VIII noble metals is present in the outer region of the microsphere sized porous particle as compared to the concentration of the one or more Group VIII noble metals in the centre of the microsphere sized porous particle.

Ex. 1001, 14:46–57.¹

¹ See also Pet. v, CLAIM LISTING.

C. Asserted Grounds of Unpatentability

The Petitioner asserts that the challenged claims are unpatentable on the following grounds (Pet. 1–2):

Ground	Challenged Claim(s)	35 U.S.C. §	Reference(s)
1	1, 3, 6, 7, 12–19, 21	103	Miura, ² AAPA
1A	9	103	Miura, AAPA, Vaughn '290 ³
1B	10, 11	103	Miura, AAPA, Peters, ⁴ or Vaughn '516 ⁵
2	1–8, 12–22	103	Miura, Baker ⁶
2A	9	103	Miura, Baker, Vaughn '290
2B	10, 11	103	Miura, Baker, Peters, or Vaughn '516
3	1–8, 12–22	103	Lin, ⁷ Baker
3A	9	103	Lin, Baker, Vaughn '290
3B	10, 11	103	Lin, Baker, Peters, or Vaughn '516
4	1–4, 6, 12–15, 18, 19, 21, 22	103	Espinoza, ⁸ AAPA

² US 2007/0197379 A1, published August 23, 2007 (Ex. 1004, “Miura”).

³ US 6,509,290 B1, issued January 21, 2003 (Ex. 1005, “Vaughn '290”).

⁴ US 6,358,881 B1, issued March 19, 2002 (Ex. 1006, “Peters”).

⁵ US 2005/0054516 A1, published March 10, 2005 (Ex. 1007, “Vaughn '516”).

⁶ US 7,053,024 B2, issued May 30, 2006 (Ex. 1008, “Baker”).

⁷ GB 2,310,384 A, published August 27, 1997 (Ex. 1009, “Lin”).

⁸ US 7,230,035 B2, issued June 12, 2007 (Ex. 1011, “Espinoza”).

The Petition also relies on the Declaration of Dr. Michael P. Harold (Ex. 1003).

III. ANALYSIS

A. Level of Ordinary Skill in the Art

The level of ordinary skill in the art at the time of the invention is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

The Petitioner proposes that a person of ordinary skill in the art “would have had an advanced degree in a relevant field, such as chemistry, chemical engineering, or material science, with experience working with supported metal catalysts, and had at least 2–3 years of experience with oxidation catalysts and their application.” Pet. 5 (citing Ex. 1003 ¶¶ 13–14). The Petitioner further proposes that “[w]ork experience can compensate for less formal education, and vice versa.” *Id.* At this stage of the proceeding, the Patent Owner does not dispute the Petitioner’s proposed definition of a person of ordinary skill in the art, but “reserves the right to challenge Petitioner’s proposed level of skill in the art and offer its own proposal if institution is granted.” Prelim. Resp. 14.

We find, at this stage, that the asserted prior art itself is sufficient to demonstrate the level of ordinary skill in the art at the time of the invention. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (prior art itself can reflect the appropriate level of ordinary skill in the art). To the extent a more precise definition is required, we apply the Petitioner’s

definition for purposes of determining whether to institute review, because it is consistent, on this record, with the disclosures of the asserted prior art references.

*B. Claim Interpretation*⁹

We interpret claims “using the same claim construction standard that would be used to construe the claims in a civil action held under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). Under that standard, claim terms generally are given their plain and ordinary meaning as would have been understood by the ordinarily skilled artisan at the time of the invention when read in the context of the specification and prosecution history. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). We construe terms in controversy only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

The Petitioner indicates that “no formal claim constructions are necessary for most of the [claim] terms” “[b]ased on the prior art’s description of the claimed elements being similar to that of the ’864 Patent specification.” Pet. 5.

⁹ We authorized the parties to jointly file the *Markman* Memorandum and Order issued in the related District Court proceeding (1-22-cv-02636) as an exhibit to the present proceeding. We have considered the Memorandum and Order, but it does not change our analysis because the Petitioner does not provide a proposed construction of any claim term, and does not explicitly take a position as to whether any portion of the preamble is limiting, as discussed below.

The “Patent Owner agrees that no construction is necessary for the Board to deny institution.” Prelim. Resp. 15. Nonetheless, the Patent Owner explains that “[c]laim construction is substantially underway in the District Court proceeding,” and provides tables that “identif[y] the agreed and disputed constructions set forth in the Parties’ Joint Claim Construction Statement.” *Id.* at 15–18 (citing Ex. 2015). The tables indicate that the Petitioner and the Patent Owner agree that “microsphere sized porous particles, each microsphere sized porous particle having a diameter of less than 1 mm, and independently comprising” as recited in claim 1 “is limiting.” *Id.* at 16. The tables further indicate, however, that the Petitioner and the Patent Owner do not agree on interpretation of “CO to CO₂ combustion promoter,” with the Petitioner indicating that “[t]he preamble is limiting—but this term in the preamble is (1) not limiting and/or (2) intended use.” *Id.* The Petitioner “alternatively” proposes construing “CO to CO₂ combustion promoter” as a “composition that promotes the oxidation of carbon monoxide to carbon dioxide.” *Id.* at 16–17. The Patent Owner “contends that the preamble is limiting in its entirety,” including the recitation of a “CO to CO₂ combustion promoter,” and proposes construing this phrase as a “composition that promotes combustion of carbon monoxide to carbon dioxide.” *Id.* at 16.

In the Preliminary Response, the Patent Owner further argues, consistent with the position the Patent Owner takes in the District Court proceeding, that “[t]o the extent any claim construction is needed, the CO promoter recitation in the preamble is limiting.” *Id.* at 18. According to the Patent Owner, the “Petitioner conceded in the district court proceeding that the preamble recites essential structure important to the invention but

attempts to carve out ‘CO to CO₂ combustion promoter’ from the preamble.”

Id. The Patent Owner contends that “[t]he ’864 Patent is replete with references to ‘CO to CO₂ combustion promoter’” and “[i]gnoring ‘CO to CO₂ combustion promoter’ in the claims would result in claims that could cover what the specification says are separate from the invention.” *Id.* at 18–19 (emphasis omitted). The Patent Owner further argues that several of the claims depend on the term “CO to CO₂ combustion promoter” for antecedent basis. *Id.*

Taking into consideration the information presented, we view the Petitioner’s failure to provide an express construction of a “CO to CO₂ combustion promoter” as recited in claim 1 as detrimental to the Petitioner’s patentability challenge, for reasons discussed more fully below.

C. 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) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)); *see also* 37 C.F.R. § 42.104(b) (requiring a petition for *inter partes* review to identify how the challenged claim is to be construed and where each element of the claim is found in the prior art patents or printed publications relied upon). This burden of persuasion never shifts to the patent owner. *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).

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).

D. The Patentability Challenges

The Petitioner’s asserted grounds for unpatentability are set forth above, and rely in part on the following prior art references. Pet. 1–2.

1. Miura (Ex. 1004)

As background, Miura explains that exhaust gas from internal combustion engines contains nitrogen oxide (NO_x), carbon monoxide (CO), and hydrocarbon (HC), which “can be purified by an exhaust gas purifying catalyst capable of oxidizing CO and HC and, at the same time, reducing NO_x.” Ex. 1004 ¶ 2. Miura further explains that known exhaust gas purifying catalysts include “three-way catalysts where a noble metal such as platinum (Pt), rhodium (Rh) and palladium (Pd) is supported on a porous metal oxide support such as γ -alumina.” *Id.* ¶ 2.

Miura’s invention relates to an internal combustion engine exhaust gas purifying catalyst that takes the form of a particulate support having a core part and a surface layer, each relatively rich in alumina, ceria, zirconia, or titania, and a noble metal supported mainly on the surface layer. *Id.* ¶¶ 1, 12, 25, 28, 48, 68. Miura discloses that the catalytic particles “can have an average particle diameter of, for example, less than 10 μm , less than 5 μm , less than 1 μm , less than 500 nm, less than 200 nm, less than 100 nm or less than 50 nm.” *Id.* ¶ 15.

Figure 2 of Miura illustrates a particular embodiment of Miura’s particulate exhaust gas purifying catalyst in which core part 22 is formed of

ZrO₂, surface layer 12 is formed of CeO₂, and platinum 13 is supported on surface layer 12:

Fig. 2

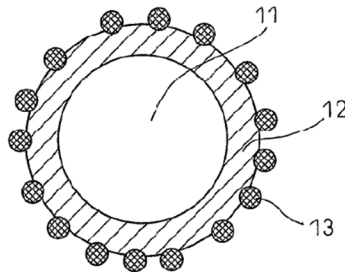


Figure 2 of Miura illustrates a cross-sectional view of an exemplary exhaust gas purifying catalyst of Miura’s invention. *Id.* ¶¶ 35, 68.

Miura discloses that Miura’s “exhaust gas purifying catalyst may be used not only by shaping the catalyst itself but also by coating it on a monolithic substrate, for example, a ceramic honeycomb.” *Id.* ¶¶ 50, 68. Miura exemplifies shaping an exhaust gas purifying catalyst by forming catalyst particles into 1 mm square pellets. *See, e.g., id.* ¶¶ 101, 104, 107, 110.

2. AAPA (Ex. 1001)

The Petitioner relies on the statement in the “Background of the Invention” section of the ’864 patent that “CO to CO₂ combustion promoters are well known,” and “are commonly made from impregnation of Group VIII noble metal or metals, commonly platinum and/or palladium, onto a porous alumina and/or other substrate microspheres of average particle size 60 to 90 microns” as applicant admitted prior art (“AAPA”). Pet. 7 (citing Ex. 1001, 1:26, 1:62–66).

We note, however, that these excerpts taken from the ’864 patent omit further disclosures that provide necessary context for the excerpted

statements. Specifically, the '864 patent begins with the “Field of the Invention” section, which states that “[t]he invention is directed to a CO to CO₂ combustion promoter comprising microsphere sized porous alumina particles comprising one or more Group VIII noble metals.” Ex. 1001, 1:19–21. The “Background of the Invention” section follows this statement, and begins by stating, in full, that “[s]uch CO to CO₂ combustion promoters are well known *and are used in a fluid catalytic cracking (FCC) unit.*” (emphasis added). *Id.* at 1: 26–27. The third paragraph of the “Background of the Invention” section states that “CO to CO₂ combustion promoters are commonly made from impregnation of Group VIII noble metal or metals, commonly platinum and/or palladium, onto a porous alumina and/or other substrate microspheres of average particle size 60 to 90 microns.” *Id.* at 1: 62–66. This paragraph goes on to state that “[s]uch impregnation results in a uniform distribution of the Group VIII noble metal throughout the internal and external surfaces of the porous microsphere.” *Id.* at 1:67–2:3 (emphasis added).

3. Baker (Ex. 1008)

Baker discloses a catalyst used in the manufacture of vinyl acetate monomer comprised of porous, metal oxide support particles having a catalytically active metal distributed in a layer between inner and outer regions of the particles. Ex. 1008, 1:60–67, 2:59–62, 3:33–36. Baker discloses that suitable metal oxides for forming the support particles include alumina, and preferred catalytically active metals include Group VIII noble metals. *Id.* at 4:29–34, 4:39–40.

Baker discloses that the catalyst may be used in either a fluid bed or fixed bed vinyl acetate manufacturing process, and when used in a fluid bed

process, at least 80%, preferably at least 90%, of the support particles have mean diameters of less than about 300 microns, but when used in a fixed bed process, the support particles typically have a diameter of 3 to 9 mm. *Id.* at 3:11–15, 2:59–62, 4:19–21.

4. *Lin (Ex. 1009)*¹⁰

Lin discloses that catalysts comprised of active metals supported on a porous support have been widely used and studied, and in such catalysts, active metals have been distributed on porous supports in four distinct patterns. Ex. 1009, 1. The first involves uniform distribution of the metal throughout the support; the second involves distribution of the metal on the outer layer of the support (“eggshell”); the third involves distribution of the metal in the internal region of the support (“egg yolk”); and the fourth involves distribution of the metal between an outer layer and the internal region of the support (“egg white”). *Id.*

Lin discloses that eggshell-type catalysts are usually used in “fast reactions,” are “capable of improving the selectivity and yield of the desired products,” and have been widely employed in “industrially-selective hydrogenation,” “selective isomerization,” and “selective oxidation,” including oxidation of CO. *Id.* at 1–2.

Lin’s invention is directed to a process for preparing eggshell-type catalysts that allows precise control of the thickness of the eggshell, the metal loading, and the metal concentration profile. *Id.* at 3, 11. Lin

¹⁰ Although the original document contains page numbers, the Petitioner added page numbers to the exhibit that differ from those of the original document. The page numbers cited in this Decision correspond to the page numbers of the original document.

exemplifies production of catalysts comprised of porous, spherical aluminum oxide (alumina) particles with a 2 mm diameter and having palladium distributed as an eggshell on the particles (Examples 1 and 3). *Id.* at 5–6, 9–10.

5. *Espinoza (Ex. 1011)*

Espinoza discloses a particulate catalyst used to catalyze the reaction of a hydrocarbon-containing gas (such as methane) and an oxygen-containing gas to produce a synthesis gas (syngas) stream containing primarily hydrogen and carbon monoxide. Ex. 1011, 1–30, 9:21–24. Espinoza discloses that the catalyst particles preferably include an alumina core and an outer layer comprising a catalytically-active metal, preferably a Group VIII metal. *Id.* at 3:51–53, 8:42–43, 8:51–53. Espinoza discloses two approaches for achieving deposition of the catalytically-active metal primarily in the outer layer of the particles. *Id.* at 4:27–47, 8:39–59. The first involves blocking the pores of the particle cores to prevent deposition of the metal into the particle cores upon subsequent impregnation with a metal solution. *Id.* at 4:29–42, 8:47–52. The second involves “employing a fast drying or low vapor pressure solvent” when impregnating porous particles with a catalytically-active metal solution, “which allows preferential deposition of the active material in an outer layer” of the particles. *Id.* at 4:43–47, 8:53–54.

Espinoza discloses that large-size support particles “greater than 0.5 mm, preferably greater than about 1 mm” are often used in fixed bed reactors, while “[s]mall-size support particles (less than 0.5 mm, preferably less than 0.25 mm) tend to be more useful in fluidized beds.” *Id.* at 7:59–65.

6. *Grounds 1, 1A, and 1B*

The Petitioner asserts that claims 1, 3, 6, 7, 12–19, and 21 are unpatentable over Miura in view of AAPA (Ground 1), claim 9 is unpatentable over Miura in view of AAPA and Vaughn '290 (Ground 1A), and claims 10 and 11 are unpatentable over Miura in view of AAPA and Peters or Vaughn '516 (Ground 1B). Pet. 6–25. We focus our discussion on independent claim 1.

The Petitioner considers the following recitation in claim 1 to be the claim's preamble: "A CO to CO₂ combustion promoter comprising microsphere sized porous particles, each microsphere sized porous particle having a diameter of less than 1mm, and independently comprising." Pet. v (Claim Listing). The Petitioner does not take a position as to whether this language constitutes a limitation of claim 1. *Id.* at 5–6, 8. Rather, the Petitioner addresses the asserted preamble "[t]o the extent it is limiting." *Id.* at 8.

In contrast, as mentioned above, the Patent Owner argues that the recitation of a "CO to CO₂ combustion promoter" in claim 1 "is limiting." Prelim. Resp. 18 (citing *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 952 (Fed. Cir. 2006) ("[T]he preamble is regarded as limiting if it recites essential structure that is important to the invention or necessary to give meaning to the claim.")). To support this position, the Patent Owner points out that the Federal Circuit has held that "when the specification describes the features of the 'invention' as a whole, this description limits the scope of the invention." *Id.* (citing *Honeywell Int'l, Inc. v. ITT Indus.*, 452 F.3d 1312, 1318–19 (Fed. Cir. 2006)). The Patent Owner argues that "[t]he '864 Patent is replete with references to 'CO to CO₂ combustion promoter' as the

invention itself,” and “states that CO to CO₂ combustion promoters are a specific type of additive used in FCC processes.” *Id.* at 18–19. The Patent Owner argues that the Specification thus shows that the “[p]atentee clearly defined the invention as a ‘CO to CO₂ combustion promoter.’” *Id.* at 19 (emphasis omitted).

The Patent Owner also argues that several of the dependent claims of the ’864 Patent rely on the recitation in claim 1 of a “CO to CO₂ combustion promoter” for antecedent basis, providing a further reason why this language constitutes a claim limitation. *Id.* (citing *In re Fought*, 941 F.3d 1175, 1178 (Fed. Cir. 2019) (“[T]he preamble constitutes a limitation when the claim(s) depend on it for antecedent basis.”)).

Consistent with the Patent Owner’s arguments, the ’864 Patent is entitled “CO to CO₂ Combustion Promoter.” And the patent’s Specification repeatedly and consistently refers to “the invention” as a “CO to CO₂ combustion promoter” used in a fluid catalytic cracking unit or process. *See, e.g.*, Ex. 1001, 1:19–27, 2:17–25, 2:64–3:14, 8:18–30; 11:1–3.

The disclosures of the ’864 patent thus align with the Patent Owner’s position that the recitation of a “CO to CO₂ combustion promoter” in claim 1 constitutes a claim limitation because the disclosures show that the phrase is “necessary to give meaning to the claim[s] and properly define the invention” as described in the patent. *In re Fritch*, 972 F.2d 1260, 1262 (Fed. Cir. 1992); *see also Kropa v. Robie*, 187 F.2d 150, 151–152 (CCPA 1951) (determining that a preamble reciting “an abrasive article” should be given patentable weight for a claim further reciting that the article comprised abrasive grains and a binder because “it is only by that phrase that it can be known that the subject matter defined by the claims is comprised as an

abrasive article” in view of the fact that “[e]very union of substances capable *inter alia* of use as abrasive grains and a binder is not an ‘abrasive article.’”).

The Patent Owner thus provides factual and legal bases for determining that a “CO to CO₂ combustion promoter,” as recited in the preamble of claim 1, is a claim limitation. By not taking a position as to whether a “CO to CO₂ combustion promoter” constitutes a claim limitation, the Petitioner does not establish that this recitation is not limiting.

We determine that the intrinsic evidence of record is sufficient to establish that a “CO to CO₂ combustion promoter” is a limitation of claim 1 because the evidence shows that this phrase is necessary to give meaning to the claim and to properly define the invention. This determination is consistent with the District Court’s corresponding determination in the *Markman* Memorandum and Order. Ex. 2024, 12–19.

As discussed above, the Petitioner also does not provide an express construction of a “CO to CO₂ combustion promoter.” The Petitioner’s arguments and characterization of the prior art, however, are premised on an implicit interpretation of this claim language. Specifically, the Petitioner argues that “Miura discloses an exhaust gas purifying catalyst capable of oxidizing CO (i.e., converting CO to CO₂).” Pet. 8 (citing Ex. 1003 ¶ 2, Abstr.). The Petitioner goes on to assert two sentences later that “Miura discloses a CO to CO₂ combustion promoter including microsphere sized particles having an average diameter size of less than 1mm.” *Id.* (citing Ex. 1003 ¶¶ 80–81). The Petitioner thus equates an exhaust gas purifying catalyst capable of oxidizing CO as disclosed in Miura with a CO to CO₂ combustion promoter. The cited paragraphs of the Harold Declaration echo the Petitioner’s characterization of Miura. Ex. 1003 ¶ 80 (“Miura further

discloses that the disclosed exhaust purifying catalyst is capable of oxidizing CO (i.e., converting CO to CO₂) . . . Therefore, Miura discloses a CO to CO₂ combustion promoter.”).

Neither the Petitioner nor the Declarant, however, provides any evidence to support this implicit interpretation of a “CO to CO₂ combustion promoter” as encompassing an exhaust purifying catalyst capable of oxidizing CO, as disclosed in Miura. For example, the Petitioner does not explain how the plain and ordinary meaning of this phrase supports such an interpretation, or identify any disclosure in the ’864 patent, or statement in its prosecution history, supporting the implicit interpretation. Nor does the Petitioner provide any evidence establishing how a person of ordinary skill in the art would have understood the meaning of this phrase at the time of filing.

The Patent Owner, on the other hand, argues that Miura “does not disclose a CO promoter” because CO promoters are particles used in a fluid bed process in an FCC regenerator at temperatures of more than 700 °C to facilitate the complete combustion of carbon monoxide. Prelim Resp. 25 (citing Ex. 2001 ¶¶ 54, 57, 58). The Patent Owner argues that, in contrast, Miura discloses catalysts “capable of oxidizing CO and HC and, at the same time, reducing NO_x,” which are used in fixed bed reactors at temperatures of less than 300 °C to purify exhaust gases. *Id.* at 25 (citing Ex. 1004 ¶¶ 2, 50, 124). The Patent Owner argues that an auto gas catalyst as disclosed in Miura, therefore, operates “at vastly different temperatures and conditions (e.g., in a car’s catalytic converter at less than 300 °C) than a CO promoter (e.g., in an industrial FCC regeneration zone at temperatures of over 700 °C).” *Id.* at 26 (citing Ex. 2001 ¶¶ 124–125). The Patent Owner argues that

“Miura does not teach that its three-way catalysts are suitable for any purpose other than being used in fixed beds for the purification of exhaust gas.” *Id.* (citing Ex. 2001 ¶ 119).

Supporting the Patent Owner’s arguments, the Declaration of Everett Carpenter indicates that “[c]atalysts are highly unique to the processes they are intended to catalyze,” and “a POSITA would not expect that a catalyst from a first system could be successfully used in a second system.”

Ex. 2001 ¶ 96. Mr. Carpenter further describes numerous examples that illustrate the highly reaction and process-specific nature of catalytic activity—shown by objective evidence the Mr. Carpenter provides. *Id.* ¶¶ 97–102 (citing Ex. 2006, 306–307; Ex. 2008, 373; Ex. 1011, 7:51–67; Ex. 2009, 216; Ex. 2019, section 35). Mr. Carpenter concludes that “a POSITA would not assume that a catalyst showing certain chemical activity for a given reaction under very specific reaction conditions would have catalytic activity for a different reaction under different reaction conditions unless the catalyst had been evaluated for that additional system.” *Id.* ¶ 103 (emphasis omitted).

The Petitioner’s unsupported, implicit interpretation of a “CO to CO₂ combustion promoter” as encompassing Miura’s three-way exhaust gas purifying catalyst capable of oxidizing CO does not suffice to establish that one of ordinary skill in the art would have had a similar understanding, particularly in view of the objective evidence the Patent Owner provides that demonstrates the highly reaction and process-specific nature of catalytic activity. The Petitioner’s implicit indication that a CO to CO₂ combustion promoter encompasses Miura’s a three-way exhaust gas purifying catalyst capable of oxidizing CO, therefore, appears to be contrary to the

understanding one of ordinary skill in the art would have had.¹¹ As a consequence, the Petitioner does not provide sufficient information to establish that one of ordinary skill in the art would have understood Miura's disclosure of a three-way exhaust gas purifying catalyst capable of oxidizing CO to constitute disclosure of a "CO to CO₂ combustion promoter" as recited in claim 1.

The Petitioner relies on AAPA "to the extent Miura does not explicitly disclose" the asserted preamble of claim 1. Pet. 8–9. The Petitioner argues that "Applicant admitted that CO to CO₂ combustion promoters were well-known in the art and 'are commonly made from impregnation of Group VIII noble metal or metals, commonly platinum and/or palladium, onto a porous alumina and/or other substrate microspheres of average particle size 60 to 90 microns, and particles having an average diameter size of less than 1mm, like those disclosed in Miura, were known for use in CO to CO₂ combustion promoters.'" *Id.* (citing Ex. 1001, 1:62–2:3).

As discussed above, however, the Petitioner's characterization of disclosures in the Background of the Invention section of the '864 patent omits details necessary to convey a complete understanding of the Applicant's description of the prior art. When taken in context and considered in their entirety, the disclosures indicate that "CO to CO₂ combustion promoters are well known and are used in a fluid catalytic

¹¹ The Petitioner's implicit interpretation of a "CO to CO₂ combustion promoter" is also inconsistent with the District Court's interpretation of "combustion" set forth in the *Markman* Memorandum and Order. Ex. 2024, 19–23.

cracking (FCC) unit,” and are commonly made by a process that “results in a uniform distribution of the Group VIII noble metal throughout the internal and external surfaces of the porous microsphere.” Ex. 1001, 1:19–27, 1:62–2:3.

Consistent with these statements in the ’864 patent, the Patent Owner argues, and provides evidence to show, that before the filing date of the application that issued as the ’864 patent, it was generally accepted in the art “that an ‘ideal’ CO promoter had noble metal ‘uniformly dispersed’ throughout a porous particle” to “present[] as much noble metal surface area to the reactants as possible.” Prelim. Resp. 22–23 (citing Ex. 2001 ¶ 69 (citing Ex. 2003, 1)). The Patent Owner further demonstrates that “[d]ispersing noble metals on a solid support was ‘universally accepted’ as the approach to making CO promoters in the FCC industry.” *Id.* at 23 (citing Ex. 2001 ¶ 68 (citing Ex. 2003, 1)); *see also* Ex. 2001 ¶ 93 (citing Ex. 2003, 1) (explaining that the support employed in CO promoters used in FCC regenerators to catalyze conversion of carbon monoxide to carbon dioxide should “have a moderately high surface area and a high pore volume to provide ready access of the reactants to the platinum catalyst,” and “[t]he platinum must be uniformly dispersed on the support for maximum effectiveness”); Ex. 2001 ¶ 80 (citing Ex. 2005, 214) (indicating that when testing numerous platinum-based CO combustion promoters, the level of CO combustion increased with the level of platinum present in the promoters).

In light of the state of the art as demonstrated by the Patent Owner’s evidence, the Petitioner does not persuasively explain why one of ordinary skill in the art seeking to produce a CO to CO₂ promoter would have looked to Miura’s disclosure of a three-way exhaust gas purifying catalyst capable

of oxidizing CO formed of platinum supported on the surface layer of microparticles. Nor does the Petitioner explain why this disclosure in Miura would have prompted one of ordinary skill in the art seeking to produce a CO to CO₂ promoter to depart from the conventional approach in the art of producing such a catalyst by uniformly distributing platinum throughout a porous support, and instead distribute the platinum on the surface layer of a support. On the record before us, therefore, the Petitioner does not provide sufficient information and explanation to demonstrate that Miura in view of AAPA discloses or would have suggested a “CO to CO₂ combustion promoter” as recited in claim 1.

Under Rule 42.104(b)(3)–(4), a Petition must identify “[h]ow the challenged claim is to be construed,” and “[h]ow the construed claim is unpatentable,” by “specif[ing] where each element of the claim is found in the prior art.” 37 C.F.R. § 42.104(b)(3)–(b)(4). The Petitioner’s provision of an unsupported, implicit interpretation of a “CO to CO₂ combustion promoter” does not meet these requirements. The Petitioner does not take a definitive position as to whether a “CO to CO₂ combustion promoter” constitutes a limitation of claim 1. Nor does the Petitioner provide an express construction of this phrase. Instead, the Petitioner implicitly interprets a “CO to CO₂ combustion promoter” in a particular manner, and bases assertions of the unpatentability of claim 1 on this implicit interpretation, without providing any support for the implicit interpretation.

The Petitioner’s contentions, therefore, are not sufficient to support institution on Ground 1 because the Petitioner does not establish a reasonable likelihood of prevailing in its challenge to the patentability of at least one claim asserted in this ground. Nor are the Petitioner’s contentions

sufficient to support institution on Grounds 1A and 1B, because the Petitioner does not rely on any disclosure in Vaughn '290, Peters, or Vaughn '516 for any information that remedies the deficiencies in the Petitioner's showing for Ground 1.

7. Grounds 2, 2A, and 2B

The Petitioner asserts that claims 1–8 and 12–22 are unpatentable over Miura and Baker (Ground 2), claim 9 is unpatentable over Miura and Baker in view of Vaughn '290 (Ground 2A), and claims 10 and 11 are unpatentable over Miura and Baker in view of Peters or Vaughn '516 (Ground 2B).

Pet. 6–25. We focus our discussion on independent claim 1.

The Petitioner argues that Miura discloses an exhaust gas purifying catalyst capable of oxidizing CO having an “eggshell” structure in which a particulate support with a surface layer comprised of CeO_2 covers a core part formed of ZrO_2 , and “a noble metal, such as platinum, is supported on the particulate support.” Pet. 26–27 (citing Ex. 1004 ¶¶ 2, 68, Abstr., Fig. 2). The Petitioner argues that although “Miura does not expressly teach the full range of” particle sizes recited in claim 1, “[a] POSITA still would have appreciated that Miura teaches benefits of using small particle size in the disclosed combustion promoter.” *Id.* at 27 (citing Ex. 1004 ¶ 68; Ex. 1003 ¶¶ 58–59, 141–145).

The Petitioner argues that Baker discloses a catalyst comprising “microspheroidal” support particles having a range of particle sizes in which a Group VIII noble metal “is distributed in the support particle . . . between an inner and an outer region of said support particle.” *Id.* at 27 (citing Ex. 1008, 1:60–67, 4:39–47; Ex. 1003 ¶¶ 138–140). The Petitioner argues that “Miura and Baker teach similar components, including silica,

aluminum, and Group VIII metals,” and “[b]y incorporating the specific particle size ranges of Baker into Miura, a POSITA would have recognized that the properties of Miura’s combustion promoter can be improved through the specific particle size teachings of Baker.” *Id.* at 28 (citing Ex. 1004 ¶ 68; Ex. 1003 ¶¶ 58–59, 141–145). The Petitioner argues that “doing so is merely the application of known techniques (using small particles) to a known structure (combustion promoter material) to yield predictable results (improved performance).” *Id.* at 28–29 (citing Ex. 1003 ¶¶ 58–59, 141–145; *KSR*, 550 U.S. at 417).

The Patent Owner argues that Miura discloses catalysts for purifying exhaust gas in a fixed bed reactor at atmospheric pressure and temperatures of about 300°C, while Baker discloses catalysts used for producing vinyl acetate monomer by reacting ethylene in acetic acid at temperatures of less than 250°C and pressures of more than 50 psi. Prelim. Resp. 40 (citing Ex. 1004 ¶ 124, Ex. 1008, 7:12–17). The Patent Owner argues that “[t]he reactions of Miura thus involve vastly different reactants, products, and reaction conditions than those of Baker,” and the “Petitioner does not explain why a POSITA would have been motivated to modify an exhaust gas catalyst with the non-analogous catalyst for making vinyl acetate monomer.” *Id.* (citing *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (a showing that “one of ordinary skill in the art could combine” but “not that they would have been motivated to do so” does not establish obviousness)).

As with Ground 1, the Petitioner’s arguments are premised on an implicit interpretation of a “CO to CO₂ combustion promoter” as recited in claim 1 as encompassing an exhaust purifying catalyst capable of oxidizing

CO, as disclosed in Miura. As discussed above for Ground 1, however, this unsupported, implicit interpretation of a “CO to CO₂ combustion promoter” does not suffice to establish that one of ordinary skill in the art would have had a similar understanding, particularly in view of the objective evidence the Patent Owner provides that demonstrates the highly reaction and process-specific nature of catalytic activity. The Petitioner, therefore, does not provide sufficient information to establish that one of ordinary skill in the art would have understood Miura’s disclosure of a three-way exhaust gas purifying catalyst capable of oxidizing CO to constitute disclosure of a “CO to CO₂ combustion promoter,” as recited in claim 1.

As for Baker, the reference does not disclose a CO to CO₂ combustion promoter. Nor does Baker disclose an eggshell-type catalyst having a catalytically active metal distributed on the outer layer of a support. Instead, Baker discloses a catalyst used in the manufacture of vinyl acetate monomer comprised of porous, metal oxide support particles having a catalytically active metal distributed in a layer between inner and outer regions of the particles (an egg white-type catalyst). Ex. 1008, 1:60–67, 2:59–62, 3:33–36. Contrary to the Petitioner’s assertion of similarity, Miura and Baker’s catalysts have different patterns of noble metal distribution and differing catalytic activities.

The Petitioner does not provide any evidence to support the Petitioner’s contention that one of ordinary skill in the art “would have recognized that the properties of Miura’s combustion promoter can be improved through the specific particle size teachings of Baker.” Pet. 28–29. Although the Petitioner cites numerous paragraphs of the Harold Declaration when making this assertion, the cited paragraphs simply mirror the

Petitioner's conclusory statements without providing any objective, supporting evidence. In contrast, as discussed above, the Patent Owner provides objective evidence demonstrating the highly reaction and process-specific nature of catalytic activity.

In light of the state of the art as shown by the Patent Owner's evidence, the Petitioner does not provide sound technical reasoning supported by objective evidence that persuasively explains why one of ordinary skill in the art seeking to produce a CO to CO₂ combustion promoter would have looked to either Miura or Baker. Nor does the Petitioner provide sound technical reasoning supported by objective evidence that persuasively explains why the ordinarily skilled artisan would have believed that modifying the particle size of Miura's exhaust gas purifying catalyst to have a range of sizes Baker discloses for its egg white-type catalyst for manufacturing vinyl acetate monomer would have improved the properties and performance of Miura's catalyst. The Petitioner, therefore, does not provide a sufficient rationale for combining Miura and Baker's teachings. Nor does the Petitioner establish that a combination of Miura and Baker discloses or would have suggested a "CO to CO₂ combustion promoter" as recited in claim 1.

On the record before us, therefore, the Petitioner does not provide sufficient information to support institution on Ground 2 because the Petitioner does not establish a reasonable likelihood of prevailing in its challenge to the patentability of at least one claim asserted in this ground. Nor does the Petitioner provide sufficient information to support institution on Grounds 2A and 2B, because the Petitioner does not rely on any

disclosure in Vaughn '290, Peters, or Vaughn '516 for any information that remedies the deficiencies in the Petitioner's showing for Ground 2.

8. Grounds 3, 3A, and 3B

The Petitioner asserts that claims 1–8 and 12–22 are unpatentable over Lin and Baker (Ground 3), claim 9 is unpatentable over Lin and Baker in view of Vaughn '290 (Ground 3A), and claims 10 and 11 are unpatentable over Lin and Baker in view of Peters or Vaughn '516 (Ground 3B). Pet. 26–41. We focus our discussion on independent claim 1.

The Petitioner argues that Lin discloses an eggshell-shaped catalyst used for selective reduction or oxidation, including oxidation of CO, and exemplifies preparing a catalyst using spherical particles having a diameter of 2 mm. Pet. 42–43 (citing Ex. 1009, 1–2, 5, 13). The Petitioner argues that although Lin does not disclose “particles sizes of less than 1 mm,” a “POSITA would have considered the similar eggshell structure of the catalyst disclosed by Lin and the similar structure taught by Baker and have been motivated to use the disclosed particle sizes taught by Baker.” *Id.* at 43 (citing Ex. 1003 ¶¶ 60–63, 205–208).

The Petitioner argues that “Lin and Baker teach similar components of the combustion promoters, including silica, aluminum, and Group VIII metals, and the improved selectivity and yield of the eggshell-shaped catalyst.” *Id.* at 44 (citing Ex. 1009, 1–2). The Petitioner argues that “[b]y incorporating the specific particle size range of Baker to Lin, a POSITA would have recognized that the properties of Lin's combustion promoter can be improved through the specific particle size teachings of Baker.” *Id.* (citing Ex. 1003 ¶¶ 60–63, 205–208). The Petitioner argues that a “POSITA would have been prompted to pursue this implementation of Baker's specific

particle size into Lin's catalyst as doing so is merely the application of known techniques (using small particles) to a known structure (combustion promoter material) to yield predictable results (improved performance)." *Id.* (citing Ex. 1003 ¶¶ 60–63, 205–208; *KSR*, 550 U.S. at 417).

The Patent Owner argues that "Lin teaches only that eggshell catalysts for the oxidation of CO are known and does not teach the size, shape, support material, or catalytically active material used in known CO oxidation eggshell catalysts." Prelim. Resp. 43 (citing Ex. 1009, 1). The Patent Owner argues that "Lin does not teach any combination of active metal and support for promoting the combustion of CO to CO₂." *Id.* at 43–44. The Patent Owner argues that "neither the Petition nor Petitioner's expert identify the properties that a POSITA would be motivated to improve through modification of Lin's particle size" and the "Petitioner thus fails to identify any actual motivation for modifying Lin with Baker in the manner alleged." *Id.* at 45–46 (citing Pet. 42–45).

In referring to "Lin's combustion promoter," the Petitioner implicitly interprets the "CO to CO₂ combustion promoter" recited in claim 1 as encompassing the unspecified catalyst for oxidizing CO disclosed in Lin. As discussed above for Ground 1, however, such an unsupported, implicit interpretation of a "CO to CO₂ combustion promoter" does not suffice to establish that one of ordinary skill in the art would have had a similar understanding, particularly in view of the objective evidence the Patent Owner provides to demonstrate the highly reaction- and process-specific nature of catalytic activity. The Petitioner, therefore, does not provide sufficient information to establish that one of ordinary skill in the art would have understood Lin's disclosure of an unspecified catalyst for oxidizing CO

to constitute disclosure of a “CO to CO₂ combustion promoter” as recited in claim 1.

And as discussed above, Baker does not disclose a CO to CO₂ combustion promoter. Nor does Baker disclose an eggshell-type catalyst having a catalytically active metal distributed on the outer layer of a support. Instead, Baker discloses a catalyst used in the manufacture of vinyl acetate monomer comprised of porous, metal oxide support particles having a catalytically active metal distributed in a layer between inner and outer regions of the particles (an egg white-type catalyst). Ex. 1008, 1:60–67, 2:59–62, 3:33–36. Contrary to the Petitioner’s assertion of similarity, Lin and Baker’s catalysts have different patterns of noble metal distribution and differing catalytic activities.

The Petitioner does not provide any evidence to support the Petitioner’s contention that one of ordinary skill in the art “would have recognized that the properties of Lin’s combustion promoter can be improved through the specific particle size teachings of Baker.” Pet. 44. Although the Petitioner cites numerous paragraphs of the Harold Declaration when making this assertion, the cited paragraphs simply mirror the Petitioner’s conclusory statements without providing any objectively supportive evidence. Ex. 1003 ¶¶ 60–63, 205–208. In contrast, as discussed above, the Patent Owner provides objective evidence demonstrating the highly reaction- and process-specific nature of catalytic activity.

In light of the state of the art as shown by the Patent Owner’s evidence, the Petitioner does not provide sound technical reasoning supported by objective evidence that persuasively explains why one of ordinary skill in the art seeking to produce a CO to CO₂ combustion

promoter would have looked to either Lin or Baker. Nor does the Petitioner provide sound technical reasoning supported by objective evidence that persuasively explains why the ordinarily skilled artisan would have believed that modifying the particle size of Lin's unspecified catalyst for oxidizing CO to have a range of sizes Baker discloses for its egg white-type catalyst for manufacturing vinyl acetate monomer would have improved the properties and performance of Lin's unspecified catalyst. The Petitioner, therefore, does not provide a sufficient rationale for combining Lin and Baker's teachings. Nor does the Petitioner establish that a combination of Lin and Baker discloses or would have suggested a "CO to CO₂ combustion promoter" as recited in claim 1.

On the record before us, therefore, the Petitioner does not provide sufficient information to support institution on Ground 3 because the Petitioner does not establish a reasonable likelihood of prevailing in its challenge to the patentability of at least one claim asserted in this ground. Nor does the Petitioner provide sufficient information to support institution on Grounds 3A and 3B, because the Petitioner does not rely on any disclosure in Vaughn '290, Peters, or Vaughn '516 for any information that remedies the deficiencies in the Petitioner's showing for Ground 3.

9. Ground 4

The Petitioner asserts that claims 1–4, 6, 12–15, 18, 19, 21, and 22 are unpatentable over Espinoza in view of AAPA. Pet. 60–67. We focus our discussion on independent claim 1.

The Petitioner argues that a "POSITA would recognize the similarity of chemistry in the catalytic reaction described by Espinoza"—conversion of methane-containing gas to carbon monoxide and hydrogen—"to CO to CO₂

combustion,” and would recognize that “CO to CO₂ combustion is an example of the type of reaction that would have benefited from an eggshell structure, like that disclosed by Espinoza.” Pet. 60–61 (citing Ex. 1003 ¶¶ 279–280). The Petitioner argues that “Espinoza discloses a range of particle sizes from 0.5 mm to 0.25 mm,” and, therefore, “Espinoza renders obvious a CO to CO₂ combustion catalyst including microsphere sized particles having a diameter size of less than 1mm.” *Id.* at 61 (citing Ex. 1011, 7:51–67; Ex. 1003 ¶¶ 279–280).

The Petitioner argues that “Applicant admitted that microsphere sized particles were well-known in the art,” and a “POSITA would have been motivated to use particles ranging in size from 1 mm in diameter and smaller with the combustion catalyst disclosed in Espinoza in light of the disclosure in Espinoza of particle sizes 0.5 mm to 0.25 mm.” *Id.* (citing Ex. 1003 ¶¶ 279–280).

The Patent Owner argues that “Espinoza does not teach a catalyst able to promote the combustion of CO to CO₂[,] nor does Espinoza suggest that the syngas catalysts of its invention would be suitable to promote the combustion of CO to CO₂.” Prelim. Resp. 48 (citing Ex. 2001 ¶¶ 133–134). The Patent Owner further argues that the “Petitioner fails to meet its burden to show a POSITA would have been motivated to modify Espinoza with AAPA in the manner Petitioner alleges.” *Id.* at 50.

Consistent with the Patent Owner’s arguments, the Petitioner does not provide any evidence to support the Petitioner’s contention that one of ordinary skill in the art “would recognize the similarity of chemistry” between CO to CO₂ combustion and reaction of a methane-containing gas with oxygen to produce hydrogen and carbon monoxide. Pet. 60. Nor does

the Petitioner provide any evidence to support the contention that one of ordinary skill in the art would have recognized that CO to CO₂ combustion catalysts “would have benefited from an eggshell structure, like that disclosed by Espinoza.” *Id.* at 61. Although the Petitioner cites numerous paragraphs of the Harold Declaration when making these assertions, the cited paragraphs simply mirror the Petitioner’s conclusory statements without providing any objective, supporting evidence. In contrast, as discussed above, the Patent Owner provides objective evidence demonstrating the highly reaction and process-specific nature of catalytic activity.

The Petitioner also does not provide sound technical reasoning supported by objective evidence that explains why Espinoza’s disclosure of a particulate catalyst for conversion of methane to synthesis gas having particle sizes ranging “from 0.5 mm to 0.25 mm” “renders obvious a CO to CO₂ combustion catalyst including microsphere sized particles having a diameter size of less than 1mm.” Pet. 61. The Petitioner’s conclusory statement to this effect does not constitute the requisite evidence necessary to establish the asserted obviousness.

Although the Petitioner further refers to “the combustion catalyst disclosed in Espinoza,” the Petitioner does not identify any disclosure in Espinoza that teaches or would have suggested that Espinoza’s syngas catalyst is a CO combustion promoter. Pet. 61. The Petitioner, therefore, does not provide sufficient information to establish that one of ordinary skill in the art would have understood Espinoza’s disclosure of a syngas catalyst to constitute disclosure of a “CO to CO₂ combustion promoter” as recited in claim 1. The Petitioner’s unsupported, implicit interpretation of a “CO to

CO₂ combustion promoter” as encompassing Espinoza’s syngas catalyst does not meet the requirements of 37 C.F.R. § 42.104(b)(3)–(b)(4).

As to the Petitioner’s reliance on AAPA, as discussed above, when taken in context and considered in its entirety, AAPA indicates that CO to CO₂ combustion promoters were widely known, were used in fluid catalytic cracking (FCC) units, and were commonly made by a process resulting in uniform distribution of a Group VIII noble metal throughout internal and external surfaces of porous microspheres. As also discussed above, the Patent Owner provides evidence to show that that before the filing date of the application that issued as the ’864 patent it was generally accepted in the art that the most effective CO to CO₂ combustion promoters were those in which a noble metal was uniformly distributed throughout porous particles, in order to present as much noble metal surface area as possible to reactants. Prelim. Resp. 22–23 (citing Ex. 2001 ¶¶ 68, 69, 80, 93).

In light of the state of the art as described in the Background of the Invention section of the ’864 patent and demonstrated by the Patent Owner’s evidence, the Petitioner does not persuasively explain why one of ordinary skill in the art seeking to produce a CO to CO₂ combustion promoter would have looked to Espinoza’s disclosure of catalyst for producing hydrogen and carbon monoxide from methane-containing gas. Nor does the Petitioner explain why this disclosure in Espinoza would have prompted one of ordinary skill in the art seeking to produce a CO to CO₂ combustion promoter to depart from the conventional approach in the art of producing such a catalyst by uniformly distributing platinum throughout a porous support, and instead distribute the platinum on a surface layer of a support. On the record before us, therefore, the Petitioner does not provide sufficient

information and explanation to demonstrate that Espinoza in view of AAPA discloses or would have suggested a “CO to CO₂ combustion promoter” as recited in claim 1.

The Petitioner’s contentions, therefore, are not sufficient to support institution on Ground 4 because the Petitioner does not establish a reasonable likelihood of prevailing in its challenge to the patentability of at least one claim asserted in this ground.

E. Discretion under 35 U.S.C. § 314(a)

In view of our determination that the Petitioner does not meet the threshold for instituting review on the merits, we need not address the parties’ dispute about whether the Board should exercise its discretion to deny institution under 35 U.S.C. § 314(a) and *Fintiv*.¹² Pet. 71–73; Prelim Resp. 52–63.

IV. ORDER

It is ORDERED that the Petition is *denied*, and no trial is instituted.

¹² *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential).

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