United States Court of Appeals for the Federal Circuit

US SYNTHETIC CORP.,
Appellant

v.

INTERNATIONAL TRADE COMMISSION,
Appellee

SF DIAMOND CO., LTD., SF DIAMOND USA, INC., ILJIN DIAMOND CO., LTD., ILJIN HOLDINGS CO., LTD., ILJIN USA INC., ILJIN EUROPE GMBH, ILJIN JAPAN CO., LTD., ILJIN CHINA CO., LTD., INTERNATIONAL DIAMOND SERVICES, INC., ZHENGZHOU NEW ASIA SUPERHARD MATERIAL COMPOSITE CO., LTD., SHENZHEN HAIMINGRUN SUPERHARD MATERIALS CO., LTD., GUANGDONG JUXIN NEW MATERIAL TECHNOLOGY CO., LTD.,
Intervenors

2023-1217

Appeal from the United States International Trade Commission in Investigation No. 337-TA-1236.

Decided: February 13, 2025

DANIEL COOLEY, Finnegan, Henderson, Farabow, Garrett & Dunner, LLP, Reston, VA, argued for appellant. Also represented by BRANDON THOMAS ANDERSEN, J. DEREK MCCORQUINDALE; JAMES R. BARNEY, MAREESA ARNITA FREDERICK, ALEXANDER EDISON HARDING, CHRISTINA JI-HYE YANG, Washington, DC.

CATHY CHEN, Office of the General Counsel, United States International Trade Commission, Washington, DC, argued for appellee. Also represented by DOMINIC L. BIANCHI, WAYNE W. HERRINGTON, PANYIN HUGHES, MICHELLE W. KLANCNIK.

THEODORE J. ANGELIS, K&L Gates LLP, Seattle, WA, argued for all intervenors. Intervenors Zhengzhou New Asia Superhard Material Composite Co., Ltd., Shenzhen Haimingrun Superhard Materials Co., Ltd., Guangdong Juxin New Material Technology Co., Ltd. also represented by GEORGE C. SUMMERFIELD, JR., Chicago, IL; TIMOTHY P. WALKER, San Francisco, CA; JAS DHILLON, Law Office of Jas Dhillon, Tracy, CA; DARLENE GHAVIMI, Spencer Fane, LLP, Austin, TX.

TIMOTHY C. BICKHAM, Dentons US LLP, Washington, DC, for intervenors SF Diamond Co., Ltd., SF Diamond USA, Inc. Also represented by STEPHEN YANG, New York, NY; LI GUO, Bunsow De Mory LLP, Redwood City, CA.

WILLIAM R. PETERSON, Morgan, Lewis & Bockius LLP, Houston, TX, for intervenors Iljin Diamond Co., Ltd., Iljin Holdings Co., Ltd., Iljin USA Inc., Iljin Europe GmbH, Iljin Japan Co., Ltd., Iljin China Co., Ltd. Also represented by JULIE S. GOLDEMBERG, Philadelphia, PA; JEFFREY G. KILLIAN, ERIC S. NAMROW, STEPHANIE LAURA ROBERTS, Washington, DC; ZACHARY DAVID MILLER, Chicago, IL.

ADAM R. HESS, Squire Patton Boggs (US) LLP, for intervenor International Diamond Services, Inc.

Before DYK, CHEN, and STOLL, *Circuit Judges*.

CHEN, *Circuit Judge*.

US Synthetic Corp. (USS) filed a complaint with the United States International Trade Commission (Commission) alleging that Intervenors, among others, violated 19 U.S.C. § 1337 (section 337) based upon the importation, the sale for importation, and the sale within the United States after importation of certain products that infringe five of USS's patents. Only one of those patents is at issue in this appeal: U.S. Patent No. 10,508,502 ('502 patent).[1] The '502 patent claims a certain type of composition known as a polycrystalline diamond compact. The Commission instituted an investigation, and in a final initial determination, the administrative law judge (ALJ) determined that claims 1, 2, 11, 15, and 21 of the '502 patent (asserted claims) were infringed, not invalid under 35 U.S.C. §§ 102, 103 or 112, and that USS satisfied the economic prong of the domestic industry requirement. *Certain Polycrystalline Diamond Compacts & Articles Containing Same*, Inv. No. 337-TA-1236, 2022 WL 897722, at *53, *90–91, *102 (Mar. 3, 2022) (*Initial Determination*). The ALJ, however, determined that the asserted claims are patent ineligible because they violate the abstract-idea exception to 35 U.S.C. § 101. *Id.* at *89–90, *102. The Commission reviewed certain aspects of the final initial determination, and, in relevant part, affirmed the ALJ's determinations that the asserted claims are patent ineligible under § 101 and that Respondents failed to prove a lack of enablement under § 112. *Certain Polycrystalline Diamond Compacts & Articles Containing Same*, Inv. No. 337-TA-1236, 2022 WL 15792877, at *23,

[1] As to the four other asserted patents, two were terminated from the investigation at the request of USS, and the remaining two were held ineligible under § 101.

*35 (Oct. 26, 2022) (*Commission Decision*). Accordingly, only the § 101 ruling prevented a section 337 violation based on infringement of the '502 patent.

USS appeals the Commission's patent ineligibility ruling. Intervenors argue in the alternative that the asserted claims are not enabled under § 112. For the following reasons, we *reverse* the Commission's conclusion that the asserted composition of matter claims are ineligible under § 101, *affirm* the Commission's enablement conclusion, and *remand*.

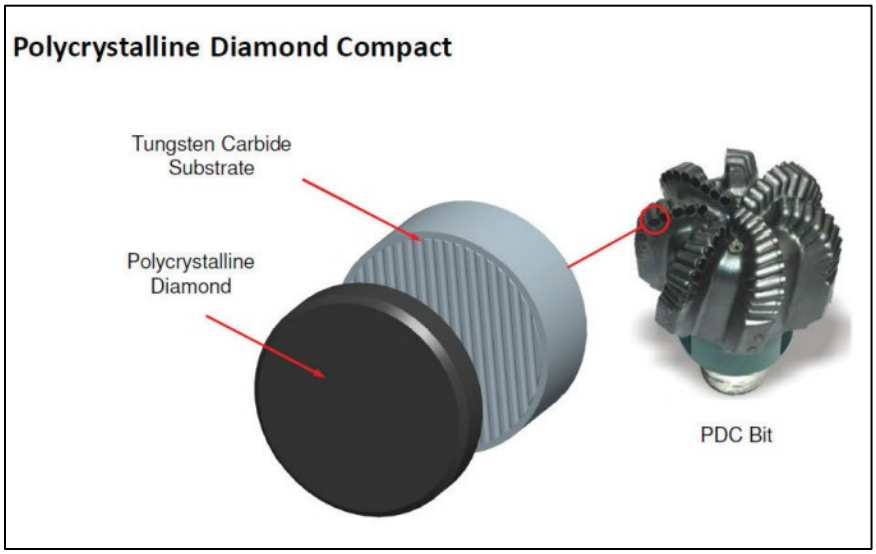
BACKGROUND

I

The '502 patent is titled "Polycrystalline Diamond Compact." A polycrystalline diamond compact (PDC) is a composition made of a polycrystalline diamond table (diamond table) bonded to a substrate. The diamond table is made from synthesized polycrystalline diamond, and the substrate is made from a cemented hard metal composite, like cobalt-cemented tungsten carbide. '502 patent col. 1 ll. 30–32, col. 10 ll. 44–45.

Due to the superabrasive nature of the diamond table, PDCs "are utilized in a variety of mechanical applications," including drilling tools and machining equipment. *Id.* col. 1 ll. 20–25. "PDCs have found particular utility as superabrasive cutting elements in rotary drill bits . . . ." *Id.*

col. 1 ll. 26–27. Below is an enlarged view of a PDC (left) and multiple PDCs in a drill bit (right).



J.A. 552.

Forming a diamond table and bonding it to the substrate requires the use of intense pressure and temperature. '502 patent col. 1 ll. 30–32. For example, the patent discloses that conventional PDCs are fabricated by placing the substrate "into a container with a volume of diamond particles positioned adjacent to the" substrate. *Id*. col. 1 ll. 42–45. Then, the substrate and diamond particles are processed under high-pressure, high-temperature (HPHT) conditions in the presence of a catalyst. *Id*. col. 1 ll. 46–48. The catalyst, often a metal-solvent catalyst like cobalt, "causes the diamond particles to bond to one another to form a matrix of bonded diamond grains defining a [diamond] table that is bonded to the substrate." *Id*. col. 1 ll. 48–54. The metal catalyst originates from the substrate and "liquefies and sweeps . . . into interstitial regions between the diamond particles during the HPHT process," thereby "promot[ing] intergrowth between the diamond particles." *Id*. col. 1 ll. 54–61.

Although the metal catalyst helps to promote the bonding between diamond grains during the formation process, the metal catalyst's presence in the formed PDC can produce undesirable characteristics. One method for reducing the amount of the metal catalyst in the resulting PDCs is called "leaching." *Id.* col. 12 ll. 20–22. Leaching involves submerging the diamond table into an acid bath, whereby the acid removes some of the metal catalyst. Related U.S. Patent No. 10,507,565 ('565 patent), which was also asserted in the underlying proceeding, explains that the leaching process "can be relatively time consuming" and "may decrease the mechanical strength of the [diamond] table." '565 patent col. 2 ll. 16–19.

As the '502 patent discloses, USS found a way to manufacture a PDC that exhibits "a high-degree of diamond-to-diamond bonding" and also contains a reduced amount of metal catalyst without leaching the diamond table. '502 patent col. 4 ll. 21–26; *see id.* col. 16 ll. 34–54 (describing a manufacturing method that uses a heightened sintering pressure of at least about 7.8 GPa and a temperature of about 1400° C). To define and describe its manufactured compositions possessing these advantages, USS measured several different parameters of its PDCs, such as dimensional information (i.e., grain size, lateral dimension of the diamond table) and certain material properties.

Of particular note are the diamond table's magnetic properties. The patent discloses that "physical characteristics of the [diamond table] may be determined by measuring certain magnetic properties of the [diamond table]." *Id.* col. 4 ll. 58–60. Specifically, USS's inventive diamond table exhibits "a higher coercivity, a lower specific magnetic saturation, or a lower specific permeability (i.e., the ratio of specific magnetic saturation to coercivity) than [diamond tables] formed at a lower sintering pressure." *Id.* col. 4 ll. 5–12. Each of these magnetic properties provides information about the quantity of metal catalyst present in

the diamond table and/or the extent of diamond-to-diamond bonding.

Coercivity is the magnetic field strength, measured in Oersteds (Oe), needed to reduce a material's magnetization from saturation to zero. The patent discloses the relationship between the measured coercivity and the average distance between diamond grains, as well as the extent of the diamond-to-diamond bonding within a particular diamond table:

> The mean free path between neighboring diamond grains of the [diamond table] may be correlated with the measured coercivity of the [diamond table]. A relatively large coercivity indicates a relatively smaller mean free path. The mean free path is representative of the average distance between neighboring diamond grains of the [diamond table], and thus may be indicative of the extent of diamond-to-diamond bonding in the [diamond table]. A relatively smaller mean free path, in well-sintered [diamond table], may indicate relatively more diamond-to-diamond bonding.

Id. col. 4 l. 66 – col. 5 l. 7. Coercivity may be measured in accordance with the American Society for Testing and Materials (ASTM) B887-03 (2008) e1 standard using a commercially available instrument. *Id*. col. 16 ll. 18–20.

Specific magnetic saturation, measured in units of Gauss per mass density ($G \cdot cm^3/g$), represents a state in which an increase in the magnetizing force does not result in an increase in the magnetization of the material. The patent discloses that "[t]he amount of the metal-solvent catalyst present in the [diamond table] may be correlated with the measured specific magnetic saturation of the [diamond table]," wherein a "relatively larger specific magnetic saturation indicates relatively more metal-solvent catalyst in the [diamond table]." *Id*. 4 ll. 61–65. Specific magnetic saturation may be measured in accordance with

the ASTM B886-03 (2008) standard using a commercially available instrument. *Id*. col. 16 ll. 13–18. The last magnetic property, specific permeability, with units of $G \cdot cm^3/g \cdot Oe$, measures the ratio of specific magnetic saturation to coercivity. *Id*. col. 4 ll. 10–12.

As the patent specification further explains, USS tested and measured its manufactured PDCs for coercivity, specific magnetic saturation, and specific permeability. *See id*. Table I. For comparison, USS also tested conventionally-made, prior art diamond tables, *see id*. Table II, and observed that the conventional diamond tables exhibit a higher cobalt content than its diamond table samples, "as indicated by the relatively higher specific magnetic saturation values." *Id.* col. 17 ll. 62–63. In addition, the conventional diamond tables "exhibit a lower coercivity indicative of a greater mean free path between diamond grains, and thus may indicate relatively less diamond-to-diamond bonding between the diamond grains." *Id*. col. 17 l. 63 – col. 18 l. 1. In other words, the "examples of the invention listed in Table I exhibit significantly less cobalt therein and a lower mean free path between diamond grains than" the prior art diamond table examples. *Id*. col. 18 ll. 1–4.

The asserted claims are directed to the composition of matter itself—not the method of manufacturing the PDC. Independent claim 1 and dependent claim 2 are representative for purposes of this appeal and recite:

> 1. A polycrystalline diamond compact, comprising:
>
> a polycrystalline diamond table, at least an unleached portion of the polycrystalline diamond table including:
>
> a plurality of diamond grains bonded together via diamond-to-diamond bonding to define interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 50 µm or less; and

> a catalyst including cobalt, the catalyst occupying at least a portion of the interstitial regions;
>
> wherein the unleached portion of the polycrystalline diamond table exhibits a coercivity of about 115 Oe to about 250 Oe;
>
> wherein the unleached portion of the polycrystalline diamond table exhibits a specific permeability less than about 0.10 $G \cdot cm^3/g \cdot Oe$; and
>
> a substrate bonded to the polycrystalline diamond table along an interfacial surface, the interfacial surface exhibiting a substantially planar topography;
>
> wherein a lateral dimension of the polycrystalline diamond table is about 0.8 cm to about 1.9 cm.

Id. claim 1.

> 2. The polycrystalline diamond compact of claim 1 wherein the unleached portion of the polycrystalline diamond table exhibits a specific magnetic saturation of about 15 $G \cdot cm^3/g$ or less.

Id. claim 2.[2]

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[2] On appeal, USS focuses its analysis on claims 1 and 2. *See* Appellant's Br. 14–15, 25–60. We do too. *See Trinity Info Media, LLC v. Covalent, Inc.*, 72 F.4th 1355, 1358 n.2 (Fed. Cir. 2023) ("We focus our analysis on those claims and limitations that . . . the patentee[] relies upon to argue that the asserted claims are patent eligible under § 101.") (citing *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1365 (Fed. Cir. 2018)). Claim 11 depends on claim 1 and further defines the lateral dimension of the diamond table. '502 patent claim 11. Independent claim 15 and dependent claim 21 recite a similar PDC as claims 1 and 2, but further limit

II

The Commission instituted the underlying investigation in December 2020. Throughout the investigation, Respondents challenged the asserted claims as being directed primarily to a patent-ineligible natural phenomenon. In the final initial determination, the ALJ disagreed, determining that the asserted claims "obviously do recite compositions of matter that are not found in nature." *Initial Determination*, 2022 WL 897722, at *70. However, applying the Supreme Court's two-step framework in *Alice Corp. v. CLS Bank International,* 573 U.S. 208 (2014), the ALJ concluded that the asserted claims are patent ineligible as directed to an abstract idea. *See Initial Determination*, 2022 WL 897722, at *76.

At *Alice* step one, the ALJ determined that the claims[3] "recite certain structural and design features," such as "a particular grain size and catalyst," along with certain "*side effects*," including the various "magnetic parameters." *Id.* at *71 (emphases added). The ALJ acknowledged that the structural and design features are not problematic under *Alice* but determined that the recited magnetic properties,

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the claimed PDC through an added feature of "thermal stability, as determined by a distance cut, prior to failure in a vertical lathe test, of about 1300 m to about 3950 m." *Id.* claim 15.

[3] Before the ALJ and the Commission, the '565 patent claims were treated as representative of the asserted claims of the '502 patent for § 101 purposes. The claims of the '565 patent include distinct elements (G-Ratio and electrical conductivity) that are not present in the asserted claims of the '502 patent. *Compare* '565 patent claim 1 *with* '502 patent claims 1, 2, 11, 15, and 21; *see* Appellee's Br. 12 n.6. Because the '565 patent is not at issue on appeal, as acknowledged by all parties, we do not focus on the ALJ's or the Commission's analysis of these elements.

in the ALJ's view, are merely unintended "results or effects [of the manufacturing process] and thus abstract." *Id.* at *71, *73. The ALJ recognized that "[t]here may be some causal connection between grain size, catalyst concentration, and other, unspecified design and fabrication choices, on the one hand, and . . . magnetic behavior, on the other hand." *Id.* at *71. But the ALJ reasoned that the "causal connection is so loose and generalized that the claimed limitations appear to be little more than side effects." *Id.* At *Alice* step two, the ALJ determined that the claims lack an inventive concept and are therefore patent ineligible under § 101. *Id.* at *74–76.

USS petitioned for Commission review on these determinations, and a divided Commission affirmed with modified reasoning. *Commission Decision*, 2022 WL 15792877, at *11–23. The Commission, at *Alice* step one, determined that "the claims are directed to the abstract idea of PDCs that achieve . . . desired magnetic . . . results, which the specifications posit may be derived from enhanced diamond-to-diamond bonding." *Id.* at *16. The Commission rejected USS's argument that the magnetic properties are structural or indicative of structure. *Id.* at *17. Instead, the Commission determined that "the measurable characteristics are the result of the sintering conditions and input materials that went into manufacturing the PDC." *Id.* The Commission quoted and agreed with the ALJ's determination that any connection between the magnetic properties and "grain size, catalyst concentration, and other, unspecified design and fabrication choices . . . is so loose and generalized" that the magnetic properties are merely "side effects." *Id.* (quoting *Initial Determination*, 2022 WL 897722, at *71). At *Alice* step two, the Commission agreed with the ALJ's analysis, concluding no inventive concept exists. *Id.* at *22–23.

Commissioner Schmidtlein, in relevant part, dissented from the majority's *Alice* step one analysis and would have concluded that the asserted claims are patent-eligible.

Looking at the claims in light of the specification, the dissenting Commissioner noted that "the claimed magnetic . . . properties reflect the microstructure of the [diamond table]." *Id.* at *43 (Schmidtlein, Comm'r, dissenting). The dissenting Commissioner took issue with the majority's labeling of certain claim elements as "results, side effects, or not a design choice" because it "fails to appreciate that the claimed parameters are concrete, objective measurements for defining the invention and which reflect the diamond microstructure." *Id.* at *44 (cleaned up). Because the asserted claims of the '502 patent were determined to be infringed and not otherwise invalid, the dissenting Commissioner would have found "a violation based on infringement of claims 1, 2, 11, 15, and 21 of the '502 patent." *Id.* at *47.

USS appealed the Commission's § 101 determination as to the asserted claims of the '502 patent. We have jurisdiction under 28 U.S.C. § 1295(a)(6).

DISCUSSION

"We review the Commission's final determinations under the standards of the Administrative Procedure Act." *Guangdong Alison Hi-Tech Co. v. Int'l Trade Comm'n*, 936 F.3d 1353, 1358 (Fed. Cir. 2019). "We review the Commission's factual findings for substantial evidence and its legal determinations de novo." *Id.*

I

Patent eligibility under § 101 is a question of law that may contain underlying issues of fact, at least at step two. *Berkheimer*, 881 F.3d at 1365. At *Alice* step one, "[w]e review de novo a determination that a claim is directed to patent-ineligible subject matter." *CardioNet, LLC v. InfoBionic, Inc.*, 955 F.3d 1358, 1367 (Fed. Cir. 2020) (citing *Berkheimer*, 881 F.3d at 1365).

Section 101 provides that "[w]hoever invents or discovers any new and useful process, machine, manufacture, or

composition of matter, or any new and useful improvement thereof, may obtain a patent therefor." 35 U.S.C. § 101. The Supreme Court, however, has held that certain categories of subject matter, including abstract ideas, are not eligible for patent protection under § 101. *Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 70 (2012). "The abstract ideas category embodies the longstanding rule that an idea of itself is not patentable." *Alice*, 573 U.S. at 218 (cleaned up). The Supreme Court has also recognized that "at some level, all inventions embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas." *Id*. at 217 (cleaned up). "Thus, an invention is not rendered ineligible for patent simply because it involves an abstract concept." *Id.*

To determine whether claimed subject matter is patent ineligible as an abstract idea, we apply the two-step framework enumerated in *Alice*.[4] First, we "determine whether the claims at issue are directed to a patent-ineligible concept." *Id*. at 218. *Alice* step one requires considering the claims "in their entirety to ascertain whether their character as a whole is directed to excluded subject matter." *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1312 (Fed. Cir. 2016) (quoting *Internet Pats. Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015)).

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[4] USS contends that the Supreme Court's analysis in *Diamond v. Chakrabarty*, 447 U.S. 303 (1980) "supports the patentability of the claims at issue here." Appellant's Reply Br. 4. We disagree that *Chakrabarty* is relevant to this case. In *Chakrabarty*, the Court distinguished a composition of matter claim from a law of nature, determining that the "claim is not to a hitherto unknown natural phenomenon, but to a nonnaturally occurring manufacture or composition of matter." 447 U.S. at 308–10. Here, by contrast, the issue is whether a composition of matter claim is directed to an abstract idea, not a law of nature.

"We also consider the patent's written description, as it informs our understanding of the claims." *CardioNet*, 955 F.3d at 1368. If the claims are not directed to an abstract idea at *Alice* step one, the inquiry ends. *Id*.

If the claims are directed to an abstract idea, we continue with *Alice* step two. In this step, we consider "the elements of each claim both individually and as an ordered combination to determine whether the additional elements transform the nature of the claim into a patent-eligible application." *Alice*, 573 U.S. at 217 (cleaned up).

A

Applying *Alice* step one, we conclude that the asserted claims of the '502 patent are not directed to an abstract idea. Rather, the claims are directed to a specific, non-abstract composition of matter—a PDC—that is defined by its constituent elements (i.e., diamond, cobalt catalyst, substrate), particular dimensional information (i.e., grain size, lateral dimension of the diamond table),[5] and quantified material properties (i.e., coercivity, specific permeability, and specific magnetic saturation),[6] whereby the material properties correlate to the diamond table's structure and thereby further inform a skilled artisan about what the claimed PDC is. We reach this conclusion by reading the claims as a whole and in light of the specification.

The dispute in this case centers around the recited magnetic properties (coercivity, specific magnetic

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[5] Claim 1 recites that the diamond grains exhibit an average grain size of about 50 µm or less and that a lateral dimension of the diamond table is about 0.8 cm to about 1.9 cm.

[6] Claims 1 and 2 recite that the diamond table exhibits a coercivity of about 115 Oe to about 250 Oe, a specific permeability less than about 0.10 $G \cdot cm^3/g \cdot Oe$, and a specific magnetic saturation of about 15 $G \cdot cm^3/g$ or less.

saturation, and specific permeability) and their relationship to the claimed PDC.[7] In resolving that inquiry, the '502 patent specification is instructive. *See Chamberlain Grp., Inc. v. Techtronic Indus. Co.*, 935 F.3d 1341, 1346 (Fed. Cir. 2019) ("The specification is helpful in illuminating what a claim is directed to." (cleaned up)). Here, the specification explains how the claimed magnetic properties correlate to structural aspects of the claimed PDC. As to coercivity, the specification discloses that the mean free path between a diamond table's neighboring diamond grains "may be correlated with the measured coercivity." '502 patent col. 4 l. 66 – col. 5 l. 1. Specifically, "[a] relatively large coercivity indicates a relatively smaller mean free path." *Id*. col. 5 ll. 1–2. Because the mean free path represents "the average distance between neighboring diamond grains," the mean free path "may be indicative of the extent of diamond-to-diamond bonding" in the diamond table. *Id*. col. 5 ll. 2–5. "A relatively smaller mean free path," the specification explains, "may indicate relatively more diamond-to-diamond bonding." *Id*. col. 5 ll. 5–7. Accordingly, the measured coercivity informs a skilled artisan about the mean free path between the diamond grains, which in turn indicates the degree of diamond-to-diamond bonding in the PDC.

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[7] Intervenors argue that this question is factual and should be reviewed for substantial evidence. Intervenors' Br. 26–27. Putting to the side whether expert testimony could be relevant to the step one inquiry, neither the ALJ nor the Commission relied on expert testimony for their relevant determinations. Thus, "our analysis at *Alice* step one involves examining the patent claims in view of the plain claim language and statements in the written description." *CardioNet*, 955 F.3d at 1374.

The specific magnetic saturation also informs a skilled artisan about physical characteristics of the PDC. Particularly, "[t]he amount of the metal-solvent catalyst present in the [diamond table] may be correlated with the measured specific magnetic saturation of the [diamond table]," where "[a] relatively larger specific magnetic saturation indicates relatively more metal-solvent catalyst." *Id.* col. 4 ll. 61–65. Specific permeability, which measures the ratio of specific magnetic saturation to coercivity, is likewise associated with the structure of the claimed PDC. *Id.* col. 4 ll. 5–12.

B

The Commission erred when it concluded that the asserted claims are directed to the "abstract idea of PDCs that achieve . . . desired magnetic . . . results, which the specifications posit may be derived from enhanced diamond-to-diamond bonding." *Commission Decision*, 2022 WL 15792877, at *16. At the core of the Commission's erroneous step one analysis is a view that the patent's disclosed relationship between the claimed magnetic properties and the structure of the PDC "is so loose and generalized that the claimed limitations appear to be little more than side effects." *Id.* at *17 (quoting *Initial Determination*, 2022 WL 897722, at *71). The Commission reiterates this on appeal, arguing that the magnetic properties "are merely side effects of the unclaimed manufacturing process and imperfect proxies for unclaimed, physical characteristics of a PDC." Appellee's Br. 56; *see also id.* at 33–36.

We disagree with the Commission's characterization of the claims and specification, and we also think the Commission's apparent expectations for precision between the recited properties and structural details of the claimed composition is too exacting for § 101 purposes. As described above, the specification of the '502 patent expressly provides the correlation between the claimed magnetic

properties and the physical characteristics of the PDC composition. *See Commission Decision*, 2022 WL 15792877, at *44 (Schmidtlein, Comm'r, dissenting) ("[I]t is undisputed that the specifications associate the claimed properties with the [diamond table] structure."). The disclosed relationship here is sufficient for § 101, where we are trying to ascertain as a matter of law whether a patent claim is directed to a specific implementation of an idea or merely just the idea itself. Contrary to the Commission's argument, no perfect proxy is required between the recited material properties and the structure of the PDC. *See Am. Axle & Mfg., Inc. v. Neapco Holdings LLC*, 967 F.3d 1285, 1302 (Fed. Cir. 2020) (requiring product claims to recite "structures specified at some level of concreteness").

The Commission relies on the specification's use of "may" to support its position that the disclosed correlation between the structural and magnetic properties is too weak and equivocal. *See* Appellee's Br. 34 ("The '502 patent specification teaches that the magnetic side effects may be indicative of a stronger PDC with enhanced diamond bonding because the effects *may* correlate with unclaimed, physical characteristics such as lower metal content or particular grain microstructures."); *see, e.g.*, '502 patent col. 4 l. 61 – col. 5 l. 7. But the Commission overlooks the broader context of the patent. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (explaining that for claim construction a disputed term must be read "in the context of the entire patent, including the specification."); *FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 132 ("The meaning—or ambiguity—of certain words or phrases may only become evident when placed in context.").

Here, the '502 patent demonstrates that the described correlations are concrete and meaningful, rather than something that is merely speculative. For example, although the specification states that the amount of metal catalyst "may be correlated" with the measured specific magnetic saturation and the mean free path "may be

correlated" with the measured coercivity, the specification immediately clarifies that a relatively larger specific magnetic saturation "indicates" relatively more metal catalyst and a relatively larger coercivity "indicates" a relatively smaller mean free path. '502 patent col. 4 l. 61 – col. 5 l. 2. Furthermore, the patent illustrates through several working examples that the claimed magnetic properties are indicative of a diamond table with "significantly less cobalt" and "a lower mean free path between diamond grains" compared to prior art diamond tables. *Id.* col. 18 ll. 1–4. In short, the properties further define the structural characteristics of the claimed product and do not merely represent some speculative goal of, for example, a stronger PDC.

The Commission also faulted USS for having "not proven that the . . . magnetic properties are indicative of any specific microstructure." *Commission Decision*, 2022 WL 15792877, at *17. As just stated, the specification sufficiently discloses the relationship between the magnetic properties of the PDC and its structure. But furthermore, we note that it was not USS's burden to prove that its patents are valid. *Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 95 (2011) ("Under § 282 of the Patent Act of 1952, a patent shall be presumed valid and the burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity." (cleaned up)); *see* 35 U.S.C. § 282(a). Therefore, "[t]o the extent the [Commission] departed from [the presumption of validity] by concluding that issued patents are presumed *valid* but not presumed *patent eligible*, it was wrong to do so." *Cellspin Soft, Inc. v. Fitbit, Inc.*, 927 F.3d 1306, 1319 (Fed. Cir. 2019).

In its decision, the Commission relies on several Federal Circuit cases that are inapplicable to this case. These cases primarily relate to methods or systems held to be directed to abstract ideas for performing functions using

generic computer components.[8] None of the cases, however, relate to a physical composition of matter. And, as the dissenting Commissioner observed, the "results" and "effects" that the Commission "identifie[d] (*i.e.*, the measurement of PDC properties) as problematic are *not* the sort of results that have been called into question in the software functionality computer cases." *Commission Decision*, 2022 WL 15792877, at *45 (Schmidtlein, Comm'r, dissenting). For example, § 101 has thwarted claims that "merely present[] the results of abstract processes of collecting and analyzing information, without more," because "[i]nformation as such is an intangible." *Elec. Power Grp.*, 830 F.3d at 1353–54. In contrast, the claimed PDC is not an abstract result of generic computer functionality, but instead is a physical composition of matter defined by its constituent elements, dimensional information, and inherent material properties. *Cf. SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1168 (Fed. Cir. 2018) (holding claims patent ineligible because "the focus of the claims is not a physical-realm improvement but an improvement in wholly abstract ideas"). Furthermore, the claimed magnetic properties—

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[8] Cases cited in the Commission's decision include: *Elec. Power Grp. LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016) (claims directed to computer-implemented methods for monitoring the performance of an electric power grid); *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229 (Fed. Cir. 2016) (claims directed to computer-implemented software for generating menus); *Yu v. Apple Inc.*, 1 F.4th 1040 (Fed. Cir. 2021) (claims directed to using multiple photos to produce an enhanced digital image); *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759 (Fed. Cir. 2019) (claims directed to vehicle-charging stations that communicate with each over a generic network); *Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335 (Fed. Cir. 2018) (claims directed to computer-implemented software for information acquisition, organization, and display).

which are integrally and necessarily intertwined with the structure of the PDC—are not merely result-focused, functional, or side effects of the manufacturing process. *See Commission Decision*, 2022 WL 15792877, at *44 (Schmidtlein, Comm'r, dissenting) ("Labeling certain claim elements merely as . . . 'results,' 'side effects,' or 'not a design choice' . . . fails to appreciate that the claimed parameters are concrete, objective measurements for defining the invention and which reflect the diamond microstructure.").

We note that USS attempts to distinguish between composition of matter limitations that are functional, which is what the composition does or accomplishes, and limitations that recite definitional properties, which, in its view, pass muster under § 101. *See* Appellant's Reply Br. 11 ("[A] measured material property, like magnetic saturation or coercivity, is not 'functional,' it is definitional; it defines what the material *is*."). But we need not make any broad, categorical statements regarding functional limitations or material properties. It is sufficient to say for the disposition of this case that the asserted claims recite a well-characterized composition of matter—with all of its claim elements that inform a skilled artisan about the structure and physical characteristics of the PDC—such that the claims are not directed to a mere abstract composition.

Accordingly, we conclude that the asserted claims of the '502 patent are not directed to an abstract idea under *Alice* step one and do not reach *Alice* step two. *CardioNet*, 955 F.3d at 1371.

II

In the alternative, Intervenors argue that the asserted claims are not enabled as a matter of law. We see no error in the Commission's rejection of that argument.

Enablement is a question of law based on underlying factual findings. *Pac. Biosciences of Cal., Inc. v. Oxford*

Nanopore Techs., Inc., 996 F.3d 1342, 1350 (Fed. Cir. 2021). A patent's specification must describe the invention and "the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same." 35 U.S.C. § 112. A patent is enabling if "at the time of filing the application one skilled in the art, having read the specification, could practice the invention without 'undue experimentation.'" *Cephalon, Inc. v. Watson Pharms., Inc.*, 707 F.3d 1330, 1336 (Fed. Cir. 2013) (quoting *In re Wands*, 858 F.2d 731, 736–37 (Fed. Cir. 1988)); *see Amgen Inc. v. Sanofi*, 598 U.S. 594, 610, 612 (2023) (stating that "the specification must enable the full scope of the invention as defined by its claims" and that "a specification may call for a reasonable amount of experimentation to make and use a patented invention.").

Assessing whether undue experimentation is required often involves "weighing many factual considerations," known as the *Wands* factors, depending on the nature of the invention and underlying art. *Cephalon,* 707 F.3d at 1336 (citation omitted). The burden of proof is on the Respondents to show that the asserted claims are invalid for lack of enablement by clear and convincing evidence. *Id*.

A

The ALJ determined that Respondents failed to "satisfy their burden [to prove non-enablement] largely because they do not discuss, or even cite to, the *Wands* factors." *Initial Determination*, 2022 WL 897722, at *86. The ALJ considered the enablement arguments that Respondents set forth but deemed them unpersuasive and beside the point. *Id*.

Respondents petitioned for Commission review on enablement, and the Commission affirmed the ALJ's conclusion with modified reasoning. *Commission Decision*, 2022 WL 15792877, at *35. The Commission noted that Respondents relied on two of USS's witnesses—not their

own—to support their lack of enablement argument. *Id.* But the Commission found that neither witness "opined on whether the experimentation necessary to make a PDC with the claimed properties would be unduly extensive," and Respondents presented only "attorney arguments" that undue experimentation is required. *Id.*

Furthermore, the Commission acknowledged USS's argument, based on its witnesses' testimony, "that the Asserted Patents disclose 'detailed manufacturing information' and 'working examples in Table I with a specific set of input conditions' such that a [skilled artisan] 'would know how the manufacturing information disclosed in the Asserted Patents can be used to achieve the claimed PDCs.'" *Id.* (citation omitted). The Commission concluded that although some experimentation might be required to make the claimed PDCs, such experimentation is not undue, and Respondents have failed to demonstrate otherwise. *Id.*

B

On appeal, Intervenors do not challenge the findings the Commission did make, but instead argue that the Commission "overlooked at least two critical factual aspects of the record." Intervenors' Br. 71. First, Intervenors argue that the Commission's "loose and generalized" determination is tantamount to unpredictability, thereby supporting a conclusion that the asserted claims are not enabled. We disagree. Notwithstanding our concern with the "loose and generalized" determination for § 101 purposes, these decontextualized words are not grounds to disturb the Commission's express, separate findings on enablement.

Second, Intervenors argue that the recited "unleached portion" in the asserted claims demonstrates a lack of enablement because that element "broadly claims every *process* that does not include leaching." *Id.* at 72 (emphasis added). This argument is forfeited. It was never presented to the ALJ or Commission, and arguments "not presented

in the tribunal under review will not be considered on appeal in the absence of exceptional circumstances." *In re Google Tech. Holdings LLC*, 980 F.3d 858, 863 (Fed. Cir. 2020). Nonetheless, the claimed PDC is not a process claim, and the recitation of "unleached portion" simply distinguishes the claimed PDC from leached diamond tables.

In making these arguments, Intervenors cite heavily to *Amgen Inc. v. Sanofi*, 598 U.S. 594 (2023), which was decided after the Commission's decision. Intervenors' Br. 71–72 ("[T]he recent Supreme Court *Amgen* opinion has emphasized why the asserted claims are not enabled as a matter of law"); *see also id.* at 73–77. But *Amgen* applied the same "statutory enablement requirement" that the Supreme Court has enforced "[f]or more than 150 years." 598 U.S. at 616. *Amgen* also reinforced "that a specification may call for a reasonable amount of experimentation to make and use a patented invention," and "[w]hat is reasonable in any case will depend on the nature of the invention and the underlying art." *Id*. at 612. The Commission adhered to these long-standing principles, dutifully considered the evidence and arguments before it, and we discern no error with its conclusion that Respondents failed to prove a lack of enablement.

CONCLUSION

We have considered the parties' remaining arguments and do not find them persuasive. For the reasons set forth above, we reverse the Commission's conclusion that the asserted claims of the '502 patent are ineligible under § 101, affirm the Commission's conclusion that Respondents failed to prove the asserted claims are not enabled, and remand.

REVERSED-IN-PART, AFFIRMED-IN-PART, AND REMANDED

Costs

Costs to Appellant.