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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

WESTERN DIGITAL TECHNOLOGIES, INC.,
Petitioner,

v.

GODO KAISHA IP BRIDGE 1,
Patent Owner.

Case No. IPR2024-01447

U.S. Patent No. 8,405,134

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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All emphasis is added in quoted material unless otherwise indicated.

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1001	U.S. Patent No. 7,884,403 (“’403 Patent”)
1002	File History for U.S. Patent No. 7,884,403
1003	U.S. Patent No. 8,319,263 (“’263 Patent”)
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1005	U.S. Patent No. 8,405,134 (“’134 Patent”)
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1008	File History for U.S. Patent No. 9,123,463
1009	U.S. Patent No. 9,608,198 (“’198 Patent”)
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1022	Japanese Patent Application No. JP2004313350
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1024	Declaration of Jeffrey Bokor, Ph.D.

Exhibit No.	Description
1025	CV of Jeffrey Bokor, Ph.D.
1026	Bowen et al., <i>Large magnetoresistance in Fe/MgO/FeCo(001) epitaxial tunnel junctions on GaAs(001)</i> , 79 Appl. Phys. Letters 1655-1657 (2001) (“Bowen”)
1027	European Patent Application No. EP1391942A1 to Nagahama et al. (“Nagahama”)
1028	Soukup et al., <i>Voltage-Current Characteristics for Electrical Conduction Through Thin MgO Films</i> , 41 J. Appl. Phys. 3229-3236 (1970) (“Soukup”)
1029	Japanese Patent Application Publication No. JP2002204004A to Sunai et al. (“Sunai”)
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1031	Simmons, <i>Generalized Formula for the Electric Tunnel Effect between Similar Electrodes Separated by a Thin Insulating Film</i> , 34 J. Appl. Phys. 1793-1803 (1963)
1032	Trasatti, <i>Electronegativity, Work Function, and Heat of Adsorption of Hydrogen on Metals</i> , 67 J. Chem. Soc. 229-236 (1972)
1033	Jullière, <i>Tunneling between ferromagnetic films</i> , 54A Phys. Letters 225-226 (1975)
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1035	Moodera et al., <i>Large Magnetoresistance at Room Temperature in Ferromagnetic Thin Film Tunnel Junctions</i> , 74 Phys. Rev. Lett. 3273–3276 (1995)
1036	Wulff et al., <i>Characterization of MgO Layers on Different Alumina and Glass Substrates by Grazing Incidence Diffractometry and Grazing Incidence X-ray Reflectometry</i> , 23 Surface & Interface Analysis 148-154 (1995)

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1046	Mathon et al., <i>Theory of tunneling magnetoresistance of an epitaxial Fe/MgO/Fe(001) junction</i> , 63 Phys. Rev. 220403 (2001)
1047	Wulfhchel et al., <i>Single-crystal magnetotunnel junctions</i> , 78 Appl. Phys. Letters 509-511 (2001)
1048	Bogicevic et al., <i>Effect of oxide vacancies on metal island nucleation</i> , 515 Surf. Sci. L481-486 (2002)
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1052	Faure-Vincent et al., <i>High tunnel magnetoresistance in epitaxial Fe/MgO/Fe tunnel junctions</i> , 82 App. Phys. Letters 4507-4509 (2003)
1053	Mitani et al., <i>Fe/MgO/FeCo(100) epitaxial magnetic tunnel junctions prepared by using in situ plasma oxidation</i> , 93 J. Appl. Phys. 8041-8043 (2003)
1054	Goniakowski et al., <i>Electronic States and Schottky Barrier Height at Metal/MgO(100) Interfaces</i> , 12 Interface Science 93–103 (2004).
1055	Wang et al., <i>70% TMR at Room Temperature for SDT Sandwich Junctions With CoFeB as Free and Reference Layers</i> , 40 IEEE Trans. Magn. 2269-2271 (2004)
1056	U.S. Patent Publication No. 2004/0136232A1 (“Hosomi”)
1057	Dieny et al., <i>Introduction to Magnetic Random-Access Memory</i> (IEEE Press 2017) (excerpts)
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1060	Jimbo et al., <i>Thermal stability of spin valves using amorphous CoFeB</i> , 165 J. Magnetism & Magnetic Materials 308-311 (1997)
1061	Cardoso et al., <i>Ferromagnetic Coupling Field Reduction in CoFeB Tunnel Junctions Deposited by Ion Beam</i> , 40 IEEE Trans. Magn. 2272-2274 (2004)
1062	U.S. Patent No. 7,270,896 (“Parkin”)
1063	Complaint, <i>Godo Kaisha IP Bridge I v. Western Digital Corporation</i> , Case No. 24-cv-00342-RGA (D. Del. Mar. 15, 2024) (without exhibits)
1064	Claim Chart for ’403 Patent, Exhibit D to Complaint, <i>Godo Kaisha IP Bridge I v. Western Digital Corporation</i> , Case No. 24-cv-00342-RGA (D. Del. Mar. 15, 2024)

Exhibit No.	Description
1065	Claim Chart for '263 Patent, Exhibit E to Complaint, <i>Godo Kaisha IP Bridge I v. Western Digital Corporation</i> , Case No. 24-cv-00342-RGA (D. Del. Mar. 15, 2024)
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1067	First Amended Complaint, <i>Godo Kaisha IP Bridge I v. Western Digital Corporation</i> , Case No. 24-cv-00342-RGA (D. Del. July 8, 2024)
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1069	Amended Claim Chart for '263 Patent, Exhibit BB to First Amended Complaint, <i>Godo Kaisha IP Bridge I v. Western Digital Corporation</i> , Case No. 24-cv-00342-RGA (D. Del. July 8, 2024)
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1075	Claim Chart for '167 Patent, Exhibit HH to First Amended Complaint, <i>Godo Kaisha IP Bridge I v. Western Digital Corporation</i> , Case No. 24-cv-00342-RGA (D. Del. July 8, 2024)

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Exhibit No.	Description
1076	Claim Chart for '134 Patent, Exhibit II to First Amended Complaint, <i>Godo Kaisha IP Bridge I v. Western Digital Corporation</i> , Case No. 24-cv-00342-RGA (D. Del. July 8, 2024)
1077	Docket, <i>Godo Kaisha IP Bridge I v. Western Digital Corporation</i> , Case No. 24-cv-00342-RGA (D. Del. Mar. 15, 2024)
1078	U.S. District Courts – Combined Civil and Criminal Federal Court Management Statistics (Dec. 31, 2023), https://www.uscourts.gov/statistics-reports/federal-court-management-statistics-december-2023 (excerpts)
1079	Microsoft Computer Dictionary (5th ed. 2002) (excerpts)
1080	Order Granting Motion to Transfer Venue to Northern District of California, <i>Godo Kaisha IP Bridge I v. Western Digital Corporation</i> , Case No. 24-cv-00342-RGA (D. Del. Sept. 4, 2024)
1081	U.S. Patent No. 7,751,156 ('156 Patent)
1082	U.S. Patent No. 8,427,791 ('791 Patent)
1083	U.S. Patent No. 8,914,970 ('970 Patent)
1084	RESERVED
1085	Joint Stipulation and Order to Stay Litigation Pending <i>Inter Partes</i> Review, <i>Godo Kaisha IP Bridge I v. Western Digital Technologies</i> , Case No. 24-cv-06555-RS, Dkt. No. 55 (N.D. Cal. Oct. 10, 2024)
1086-1095	RESERVED
1096	Transcript of June 13, 2025 Conference Call with Patent Trial and Appeal Board
1097	Wang et al., <i>Deposition of in-plane textured MgO on amorphous Si₃N₄ substrates by ion-beam-assisted deposition and comparisons with ion-beamassisted deposited yttria-stabilized-zirconia</i> , 71 Appl. Phys. Letters 2955-2957 (1997)
1098	Inaba et al., <i>Magnetic and Crystallographic Properties of Co–Cr–Pt Longitudinal Media Prepared on MgO Seedlayers Deposited by ECR Sputtering</i> , 36 IEEE Trans. Magn. 2372-2374 (2000)

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1099	Tonouchi et al., <i>Epitaxial growth of NbN on an ultrathin MgO/semiconductor system</i> , 62 J. Appl. Phys. 961-966 (1987)
1100	Plummer et al., <i>Silicon VLSI Technology, Fundamentals, Practice and Modeling</i> (Prentice Hall 1999) (excerpts)
1101	Transcript of Deposition of Caroline A. Ross, Ph.D., taken September 18, 2025
1102	Transcript of Deposition of Caroline A. Ross, Ph.D., taken September 19, 2025
1103	Google Scholar citation count re: Parkin et al., <i>Giant tunnelling magnetoresistance at room temperature with MgO (100) tunnel barriers</i> , 3 Nature Materials 862-867 (2004), https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Giant+tunnelling+magnetoresistance+at+room+temperature+with+MgO%28100%29&btnG=
1104	Renault et al., <i>Strong <200> and <111> Preferred Orientations of MgO Thin Films Synthesized on Amorphous Substrate by Aerosol Assisted-Metallorganic Chemical Vapor Deposition</i> , 146 J. Electrochem. Soc.3731-3735 (1999)
1105	Reply Declaration of Jeffrey Bokor, Ph.D.

Claims 1-4 of the '134 Patent never should have issued. IP Bridge (“IPB”) does not seriously dispute that the Petition’s prior art taught each and every claim limitation or that a skilled artisan would have been motivated to combine them, instead asserting no reasonable expectation of success, attacking strawmen, and improperly critiquing isolated aspects of the art rather than their collective teachings.

After admitting that each of Bowen’s, Nagahama’s, and Parkin’s MTJs feature MgO(001)/(100) barrier layers, IPB still asks the Board to scrap those teachings by finding that the prior art lacks the MgO(001) barrier layer in Claims 1[d]/3[d]. IPB also argues an artisan would not have expected success in growing MgO(001) on amorphous surfaces like CoFeB layers, yet Parkin, Nagahama, inventor Yuasa, and the scientific literature each did it and provided far more details than the '134 Patent. Even ignoring Ross’ retraction of nexus for Claims 3-4, IPB offers no objective evidence tied to the novel aspects of the '134 claims.

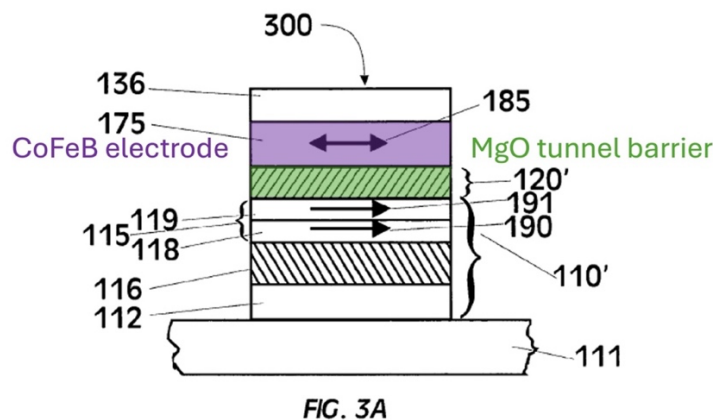
The Board recently found evidence of “material error by the Office” during examination of the related '138 Patent. IPR2025-00701, Paper 9, 2. IPB’s latest disclaimers and abandonments within the patent family acknowledge the '134 Patent should never have issued.

I. PARKIN INDISPUTABLY DISCLOSED MGO(100) ATOP COFEB

IPB admits “Bowen and Nagahama have MgO(001) layers,” POR, 5, and that “Parkin [also]... says the MgO layer is (100) but says nothing about why that is so,”

POR, 23. Despite its admissions, IPB argues that neither Bowen-Parkin nor Nagahama-Parkin in Grounds 1-2 “meets the claimed MgO(001) layer” because “Petitioner cites no evidence of a crystalline MgO(001) layer forming atop a CoFeB underlayer.” POR, 4-6; *see also* POR, 18-27. MgO(001) and MgO(100) “are the same.” POR, 10 n.4.

But the Petition demonstrated that Parkin showed an MgO(100) layer formed atop a CoFeB electrode and plainly met its burden for Grounds 1-2. Pet., 39-41, 60-61. Parkin indisputably disclosed forming MgO(100) atop an amorphous CoFeB electrode. Parkin’s Figure 3A taught a CoFeB layer 175 above a “highly (100) textured MgO layer”:



Pet., 39 (citing EX1062, Fig. 3A, 19:16-17); *see also* EX1062, 9:58-10:2 (using polycrystalline or single-crystal MgO), 18:49-51 (“highly textured (100) MgO tunnel barriers”); EX1024 ¶¶129, 144; Pet., 33-34. Parkin explained that its electrodes may be “inverted”: the lower reference electrode 115 in FIG. 3A “may be

formed from one or more ferromagnetic layers 118 and 119,” or “[t]he MTJ device of FIG. 3A may also be *inverted*, such that the reference ferromagnetic electrode is formed above the tunnel barrier and *the storage layer is formed beneath the tunnel barrier.*” EX1062, 17:19-20, 17:7-10; *see* Pet., 39-40.

The Petition showed the CoFeB storage layer 175 is beneath the MgO(100) layer in Parkin’s inverted embodiment. Pet., 40 (Ground 1 quoting EX1062, 17:7-10), 60 (Ground 2 referencing Ground 1 discussion). The Board agreed that “[w]ith this inversion” in Parkin, “layer 175 would then be located on substrate 111.” ID, 28.

After institution, IPB abandoned its inaccurate argument that Parkin’s inversion embodiment did not teach a ferromagnetic layer “below the tunnel barrier is formed of crystalline CoFeB.” ID, 28 (quoting POPR, 47); *see generally* POR. “By raising an argument in its Preliminary Response, but not its Response, a patent owner waives said argument.” *Parus Holdings v. Google*, 70 F.4th 1365, 1373 (Fed. Cir. 2023).

The parties agree the Board correctly found that IPB’s arguments about Parkin’s “inverted” Figure 11 showed an “amorphous” “storage layer formed beneath the tunnel barrier” of MgO(100). ID, 28 (citing POPR, 47); POPR, 47 (“[A]lthough the storage layer and reference electrode are inverted compared to the device of FIG. 3A, the electrode beneath the tunnel barrier (540) is amorphous, not

crystalline.”); *see also* EX2018, 134:1-138:11 (Bokor: Parkin’s Fig. 11 disclosed forming a polycrystalline MgO(100) layer over an amorphous CoFeB layer.).

Indeed, Parkin’s Figure 11 confirms Figure 3A’s “inverted” embodiment expressly discloses an MgO(100) layer over an amorphous CoFeB layer. Figure 11 shows the storage and reference electrodes in Figures 3A-3B’s devices “inverted.” EX1062, 22:29-33. “[S]torage magnetic electrode 510 is formed on the underlayer 512 by deposition of a layer 515 comprising an amorphous ferromagnetic alloy” of “CoFeB.” EX1062, 22:56-58, 22:62-63. The CoFe “interface layer 520” is optional. EX1062, 22:66-67. An “MgO tunnel barrier 540” is formed atop storage layer 510, EX1062, 23:6, and a “reference magnetic electrode 560” is placed atop the MgO. EX1062, 23:15.

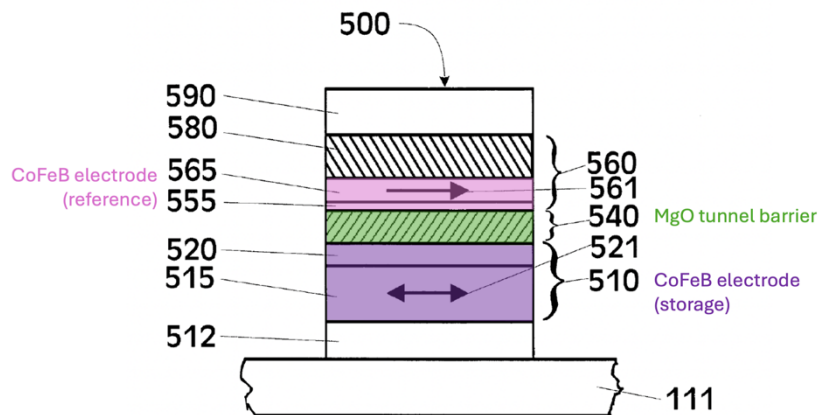


FIG. 11

EX1062, Fig. 11 (annotated).

Parkin’s multiple, express, and uncontested disclosures of forming an MgO(100) tunnel over an amorphous CoFeB layer unravels IPB’s argument that Claims 1[d]/3[d] are not taught or suggested by Bowen-Parkin or Nagahama-Parkin in Grounds 1-2.

II. A SKILLED ARTISAN KNEW HOW TO GROW MGO(001) ON AMORPHOUS SURFACES

IPB next asks the Board to disregard Parkin, Nagahama, and the scientific literature (including Yuasa’s own publications) to find that “a POSA would not have reasonably expected success in forming the claimed MgO(001) layer on a CoFeB underlayer.” POR, 6, 22-43. However, the art taught forming thin (<10-nm) MgO(001) layers on amorphous surfaces.

A. A Skilled Artisan Would Have Reasonably Expected Success In Growing MgO(001) On Amorphous Surfaces Including CoFeB

It’s black letter law that “[e]vidence of a reasonable expectation of success... ‘may flow from the prior art references themselves [or] the knowledge of one of ordinary skill in the art.’” *Elekta v. ZAP Surgical Sys.*, 81 F.4th 1368, 1377 (Fed. Cir. 2023) (citation omitted). Simply put, IPB’s premise that one of skill would not have formed MgO(001) on amorphous surfaces with any reasonable expectation of success collapses in view of prior art teaching the opposite. POR, 22-43.

There is no dispute that Parkin’s “inverted” Figures 3A and 11 embodiments expressly taught or suggested forming an MgO(100) layer on an amorphous CoFeB

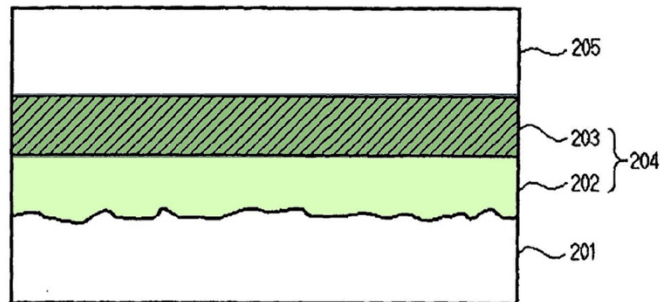
underlayer. *Supra* §I; EX1062, 17:7-20, 19:17-19, 22:29-23:15; EX1024 ¶¶129, 144-48; EX2018, 134:1-138:11; ID, 28 (citing POPR, 47); EX1101, 156:17-157:14 (Ross admitting Parkin’s disclosure).

IPB and Ross admit that Nagahama taught growing MgO(001) seed layers on amorphous surfaces: “Nagahama formed a ‘MgO double underlayer’... compris[ing] an amorphous **MgO**

FIG. 12

[layer 202] covered by a ‘(001)-oriented highly oriented’ crystal

MgO layer [203] ‘on an amorphous substrate.’” POR, 45-46 (quoting EX1027 ¶¶55-59,



61, 67); EX2053 ¶188 (same). That is exactly what is shown in Nagahama’s Figure 12. EX1027 ¶58; EX1105 ¶20. These layers are 10-nm thick or less: “MgO layer 202 is 3 to 10nm, and... MgO(001) crystal layer 203 is also 3 to 10nm.” EX1027 ¶58; EX1105 ¶20. Nagahama’s undisputed disclosure demonstrates forming MgO(001) on amorphous surfaces. EX1027 ¶¶58-59; EX2053 ¶188; EX1105 ¶¶20-22.

The scientific literature, including Yuasa’s own publications, contradicts IPB’s claim that a skilled artisan would have believed growing MgO(001) on CoFeB or other amorphous surfaces impossible. Ross’ refusal to address these publications,

EX1101, 104:14-105:21, 109:18-110:4, 116:6-16, 124:16-125:8, 146:9-19, shows her claim that MgO forms only “random grain orientation” on amorphous surfaces is unreliable, EX2053 ¶¶145-63; EX1105 ¶¶25-30.

IPB argues Yuasa’s “surprising” discovery that MgO(001) could be formed on amorphous CoFeB in his 2005 *Applied Physics Letters* article (“APL 2005”) supports its claim. POR, 26 (citing EX2006, 2). But APL 2005 refutes it by citing Wang’s 1997 article (EX1097) observing successful MgO(001) growth on amorphous substrates: “Note that ***MgO layer grown on amorphous Si₃N₄ substrates*** by ion beam assisted deposition ***is also (001) textured right at the inception*** of the deposition.” EX2006, 2 & n.14; EX1105 ¶¶6-7.

Well before Yuasa, Wang 1997 observed “in-plane textured (100) MgO on amorphous Si₃N₄,” and their findings had “important implications” for “real manufacturing processes, including... magnetic thin films.” EX1097, Abstract; EX1105 ¶8. Wang deposited MgO thin-films and examined their crystallinity using RHEED diffraction. EX1097, 2955; EX2053 ¶179 (Ross: “RHEED is a technique that determines the surface structure of a film....”). It found “a crystalline pattern of MgO at about 20Å [2nm],” that “suggests that the MgO molecules form well-aligned small 3D crystallites right at the inception of deposition, i.e., right at the nucleation stage.” EX1097, 2955, Fig. 1(a)-(c); EX1105 ¶¶9-11.

Yuasa's 2004 *Nature Materials* article (EX2008), citing Inaba 2000 (EX1098), recognized "textured Fe/MgO/Fe MTJs with (001) orientation[] [may] be prepared on ***any kinds of substrates*** by using a highly oriented MgO(001) seed layer." EX2008, 870 & n.21. Inaba reported, at room temperature, "prepar[ing] Co-Cr-Pt/Cr-alloy/MgO longitudinal thin film media" on thin-film "MgO seedlayers" on "glass substrates." EX1098, 2372; EX1105 ¶¶13-15. Its "10 nm-thick MgO seedlayer... shows well developed {100} texture." EX1098, 2373, Fig. 2; EX1105 ¶16.

Wulff 1995 also expressly taught that "[a]part from epitaxy, MgO grows with strong preferential <100> orientation ***regardless of the substrate selection.***" EX1036, 148. IPB and Ross falsely claim Wulff "discuss[ed] MgO films with thicknesses of at least 100 nm," not "10 nm thick or less as used in MTJs." POR, 38; EX2053 ¶145. But Wulff cited Tonouchi 1987 (EX1099), confirming this property was true for 0.5-1.0-nm-thick MgO layers. EX1105 ¶17. Tonouchi confirmed MgO(100) grew "regardless of the substrate selection" and proved it for 1-nm "(100)-oriented MgO" layers grown on amorphous "oxidized Si" substrates. EX1099, 962, 964; EX1105 ¶¶17-19. Wulff's citation to Tonouchi proved that there was no material difference between 1- and 100-nm MgO layers. EX1105 ¶¶17-19; *see* POR, 38-39; EX2053 ¶¶145-66.

Petrov (EX2065) and Aboelfotoh (EX2067) provide no support that MgO would be expected to exhibit “random grain orientation” on amorphous surfaces. POR, 39 (citing EX2053 ¶¶153-63). Petrov never mentions MgO. *See* EX2065, S118, S126; EX1105 ¶25; EX2053 ¶¶153-59 (citing EX2065). Aboelfotoh 1973 observed “an initial random orientation” because his “deposition rate is relatively high for those films.” EX1104, 3735; EX1105 ¶30. Aboelfotoh’s different results under specific parameters do not override the scientific consensus regarding forming MgO(001) on amorphous substrates. EX1105 ¶¶26-30. “[T]he expectation of success need only be reasonable, not absolute.” *Pfizer v. Apotex*, 480 F.3d 1348, 1364 (Fed. Cir. 2007); *Soft Gel v. Jarrow Formulas*, 864 F.3d 1334, 1342 (Fed. Cir. 2017) (“[A]bsolute predictability” is “an incorrect legal standard for obviousness.”).

B. The ’134 Patent Itself Provides No Instructions For Forming MgO(001) Atop CoFeB

The parties agree that Bowen, Nagahama, and Parkin disclose MgO(001)/(100) layers. *See* POR, 5, 23. IPB’s insistence that Petitioner demonstrate more than an express teaching to form MgO(001) on CoFeB improperly demands more from the prior art than its own ’134 Patent. POR, 22; *see also, e.g., Lockwood v. Am. Airlines*, 107 F.3d 1565, 1570 (Fed. Cir. 1997) (“[T]he ’359 patent itself does not disclose the level of detail that Lockwood would have us require of the prior art.”); *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994) (Appellant’s

inability to “provide the type of detail in his specification that he now argues is necessary in prior art references” implies one of skill “would have known how to implement th[ose] features.”).

The '134 Patent provides nothing on how to fabricate MgO(001) on an amorphous CoFeB layer. *See* EX1005, 8:56-9:10. Its entire description for the MgO layer in its CoFeB electrode “variation” is one sentence:

1(B). As shown in FIG. 11, the MTJ device of the variation is characterized in that, as in the MTJ device of the above-described embodiments, the electrodes disposed on either side of a single-crystal $\text{MgO}_x(001)$ layer **503** or an oxygen-deficit poly-crystal MgO_x ($0 < x < 1$) in which the (001) crystal plane is preferentially oriented comprises an amorphous ferromagnetic alloy, such as CoFeB layers **501** and **505**. The

EX1005, 8:60-66. Despite this allegedly “surprising” discovery, POR, 26, 42-43, 52, 58, the '134 Patent expresses no surprise and provides no specific instructions for forming MgO on CoFeB, *see* EX1005, 8:56-9:10. Others, including the prior art in Grounds 1-2, already explained how to grow MgO(001) on amorphous underlayers, including CoFeB. *Supra* §§I, II.A. IPB is not entitled to a patent for “accomplishing” what the prior art already taught.

III. THE PETITION MET ITS BURDEN FOR GROUNDS 1-2

With the prior art undisputedly teaching forming MgO(001)/(100) barrier layers atop amorphous CoFeB surfaces, IPB resorts to arguing patentability by ignoring the scientific literature, attacking strawmen, and asserting an incorrect

obviousness standard. Its diversions do not overcome the *prima facie* obviousness of its claims.

A. IPB Applies An Incorrect Obviousness Standard

IPB does not seriously dispute that all claim limitations are taught or suggested by the prior art. Instead, it challenges reasonable expectation of success, claiming the Petition insufficiently “establish[es] that a POSA would have combined the teachings of the prior art in the manner claimed.” POR, 4. IPB’s argument improperly requires blind adherence to Bowen’s/Nagahama’s fabrication steps while ignoring their modified electrodes.

IPB ignores that a skilled artisan is not an automaton but instead “a person of ordinary creativity,” who “in many cases... will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *KSR Int’l v. Teleflex*, 550 U.S. 398, 420-21 (2007); *ClassCo v. Apple*, 838 F.3d 1214, 1219 (Fed. Cir. 2016) (*KSR* does not dictate only “combinations of a puzzle element A with a perfectly fitting puzzle element B.”).

“It is well-established that a determination of obviousness based on teachings from multiple references *does not require an actual, physical substitution of elements.*” *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012); *Allied Erecting v. Genesis Attachments*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) (Obviousness does not

require “bodily incorporat[ion]” of features “into the structure of the primary reference.” (citation omitted)).

B. Ground 2 Shows MgO(001) For Claims 1[d]/3[d]

IPB argues Ground 2 never shows that the Nagahama and Sunai/Parkin combination would have met the MgO(001) layer in Claims 1[d]/3[d]. POR, 19-21. Both limitations simply require a “single-crystalline” or “poly-crystalline” MgO(001) tunnel barrier layer, EX1005, 10:9-13, 10:25-29, and the Petition explained that Nagahama’s “polycrystalline MgO(001) tunnel barrier layer” “taught or suggested this limitation.” Pet., 56 (citing EX1027 ¶73), 63 (same for Claim 3[d]). Ignoring the actual ground only confirms the Petition met its burden.

Next IPB argues that Nagahama only “achieved its MgO(001) layer by depositing” it on a “ferromagnetic electrode” and “provides no evidence of what MgO structure would have formed on the CoFeB electrode.” POR, 20 (emphasis original). IPB’s argument hinges on its debunked theory that “a POSA would have expected the MgO layer in this combination to *not* have an (001) orientation.” POR, 21 (emphasis original). Nagahama itself, Parkin, Yuasa, and the references Yuasa cites all demonstrate that one of skill knew how to fabricate <10-nm MgO(001) on an amorphous surface. *Supra* §II. Parkin expressly taught forming MgO(001) above amorphous CoFeB and taught high TMRs from doing so. EX1062, 17:7-10, 18:49-55; EX1101, 156:17-157:14.

A “skilled artisan would have had a resoundingly ‘reasonable expectation of success’” where the prior art teaches the specific combination. *In re Kubin*, 561 F.3d 1351, 1360-61 (Fed. Cir. 2009); *E.I. du Pont v. MacDermid Printing*, 657 F. App’x 1004, 1014-15 (Fed. Cir. 2016) (reasonable expectation of success where “prior art digital plates already included” claimed feature). Because “MgO grows with strong preferential <100> orientation regardless of the substrate selection,” EX1036, 148 (citing EX1099, 962); EX1105 ¶17, depositing polycrystalline MgO(001) was not any “achieve[ment],” POR, 20. IPB misunderstands that “a finding of obviousness does not require a guarantee of success... [because] an expectation of success need only be *reasonable*, not absolute.” *Pfizer v. Sanofi Pasteur*, 94 F.4th 1341, 1352 (Fed. Cir. 2024) (emphasis original).

Personal Web v. Apple does not support IPB’s argument that Ground 2 “needed to provide a detailed explanation of the ‘contemplated workings.’” POR, 21 (citing 848 F.3d 987, 994 (Fed. Cir. 2017)). *Personal Web* held that “[t]he amount of explanation” “necessarily depends on context,” and “[a] brief explanation may do all that is needed if, for example, the technology is simple and familiar and the prior art is clear.” 848 F.3d at 994. Ground 2 provided an appropriate level of explanation: it proposes a simple substitution of known layers, plainly disclosed by Parkin. POR, 21; *supra* §I. IPB has not shown the combination was any more complicated.

C. Ground 1 Shows A Reasonable Expectation Of Success In Forming MgO(001)

For Ground 1, IPB does not dispute that all limitations are satisfied by Bowen and Sunai/Parkin, or the motivation to combine them. *See* POR, 22-27. Instead, it asserts that a skilled artisan lacked a reasonable expectation of success in forming MgO(001) on CoFeB for Claims 1[d]/3[d] because “[n]one of the cited evidence” shows an “[MgO](001) orientation’ despite being formed on a CoFeB layer.” POR, 22.

The “cited evidence” of Parkin undisputably shows MgO(100) atop CoFeB and entirely defeats IPB’s allegation of no reasonable expectation of success. *See supra* §I; EX1101, 156:17-157:14; *Kubin*, 561 F.3d at 1360-61. IPB’s only response is acknowledging Parkin’s Figure 3A: “Parkin (‘EX1062’), 18:49-51 says the MgO layer is (100) but says nothing about why that is so.” POR, 23. But “prior art patents are presumed enabled,” and IPB never disputed Parkin’s enablement. *Amgen v. Hoechst Marion Roussel*, 314 F.3d 1313, 1354 (Fed. Cir. 2003); *see* POR, 22-27. IPB inaccurately claims that Figure 3A “achieves an MgO(100) layer by depositing it on a ‘crystalline’ (100) layer 115” of CoFe, POR, 24 (citing EX1062, 13:3-25, 17:18-39), while pointedly ignoring that Parkin’s “inverted” Figure 3A embodiment that defeats IPB’s argument, *see id.*; Pet., 40 (quoting EX1062, 17:7-10).

IPB argues that “Parkin provides no support” that one of skill “would understand that the MgO... would still have the same (001) orientation despite being formed on a CoFeB layer because that is not what Parkin did.” POR, 24-25 (internal citation/quotation marks omitted). But Parkin’s uncontested disclosure of forming MgO(100) atop CoFeB is *exactly* what Parkin did. *Supra* §I.

IPB next argues that any understanding “that the claimed MgO(001) layer could be formed on CoFeB is refuted by the contemporaneous teachings in the art.” POR, 26 (citing EX1055, 2270) (internal citation omitted). The only “contemporaneous teachings in the art” IPB cites is Wang 2004 (EX1055). *See* POR, 26. When IPB’s cropped quote is expanded, Wang actually states that “amorphous CoFeB does not support any crystalline grain growth of the CrMnPt layer,” without addressing CoFeB’s effect on an Al₂O₃ or MgO tunnel barriers. EX1055, 2270. IPB’s citation to Ross’ declaration adds nothing other than the false characterization of the Chromium-Manganese-Platinum layer as “a crystalline barrier layer,” EX2053 ¶¶110-12, which it is not, EX1105 ¶12; EX1101, 179:9-13 (Ross: Wang’s CrMnPt is “intended to be an antiferromagnetic pinning layer”). IPB supplies no “contemporaneous teachings in the art” proving Parkin wrong. *See* POR, 26; *supra* §II.A.

Finally, IPB attacks a strawman, contending that “Petitioner fails to demonstrate that a POSA would have reasonably expected the claimed MgO(001)

layer to result” from annealing. POR, 28; *see also* POR, 27-43. But the Petition established one of skill had reasonable success of forming MgO(001)/(100) on amorphous CoFeB for Claim 1[d]/3[d], Pet., 32-34, 45, and Parkin’s unchallenged disclosures show exactly that, *supra* §I. IPB’s tome on annealing is irrelevant to finding the prior art taught or suggested Claim 1[d]/3[d]. *See* POR, 27-43.

D. One Of Skill Would Have, And Did, Combine The References As Set Forth In The Petition

IPB next argues one of skill would not “use a ferromagnetic layer with boron because boron was known to yield a non-crystalline ferromagnetic structure that was the opposite of what Bowen and Nagahama were trying to achieve.” POR, 43-44. Contradicting itself, IPB then argues that a skilled artisan wouldn’t have crystallized CoFeB electrodes “because the entire purpose of using boron in the secondary references was to avoid crystallization.” POR, 44.

Again, IPB ignores the teachings in Parkin, Sunai, Jimbo, and Cardoso. *E.g.*, Pet., 37 (citing EX1030 ¶¶27-28; EX1060, 311; EX1061, 2272-73); Pet., 40 (citing EX1062, 18:49-51). Parkin expressly taught the benefits of both using “amorphous” electrodes and “crystalliz[ing]” them:

[V]ery high TMR values are unexpectedly found for MTJs with highly textured (100) MgO tunnel barriers but with *nominally amorphous* storage layers. Cross-section transmission electron microscopy reveals that a portion of the storage layer 175 adjacent to the MgO tunnel

barrier 120’ *has crystallized* and is, moreover, textured in the same orientation as the crystalline MgO tunnel barrier.

EX1062, 18:49-55. IPB’s argument that a skilled artisan would disregard what the prior art recommends is far-fetched. *E.g.*, *Soft Gel*, 864 F.3d at 1341-42 (affirming obviousness because patent owner “fails to account for the recommendations in the Nazzal reference”).

IPB argues that there is “no reason” one of skill would crystallize Sunai’s or Parkin’s electrode because their “benefits... are achieved because the CoFeB electrode is *amorphous*.” POR, 51-52 (emphasis original); *id.*, 46-48. IPB ignores Parkin’s express teaching that “very high TMR values” occur with some crystallization in the “*nominally* amorphous” CoFeB layers. EX1062, 18:49-55 (a portion of storage layer 175 “has crystallized”), 19:10-17 (specifying “only a very thin crystalline interface layer would need to be formed” in “the CoFeB layer 175”).

Sunai recognized that adding boron desirably inhibited crystallization at deposition and permitted the formation of “a continuous film... [with] a film thickness of about 0.5 nm.” EX1030 ¶¶28; EX1105 ¶23. Absent boron, IPB concedes Sunai’s film would “result in unstable magnetization and *reduce TMR*,” POR, 47 (emphasis original) (citing EX1030 ¶¶27, 30); EX1105 ¶23. IPB’s argument that Sunai discouraged crystallization at deposition, POR, 47, does not apply to the effects of crystallizing CoFeB *after* it is deposited, EX1030 ¶¶27, 30 (describing

“film formation”); *see also* Pet., 11-12 (citing EX1024 ¶¶60, 62); EX1105 ¶23. Indeed, Ross concedes it was known that amorphously deposited CoFeB layers would crystallize upon annealing. *See* POR, 35 (“Jimbo and Cardoso teach that annealing amorphous CoFeB yielded a (111)-textured material” which is a “crystalline structure.” (citing EX2053 ¶¶137-38)).

IPB next errs by “attack[ing] the disclosures of [prior art] references individually” and ignoring their combined teachings, but even these attacks lack merit. *Palo Alto Networks v. Centripetal*, 122 F.4th 1378, 1386 (Fed. Cir. 2024) (Prior art “must be read together, not in isolation.”); POR, 46-49, 53-57.

First, IPB claims that “Jimbo’s devices have no TMR,” POR, 53-54, despite Jimbo expressly teaching an improvement to the “MR ratio” with annealing and crystallization of its CoFeB layers. EX1060, 311; EX1024 ¶¶61-62. Jimbo’s teachings are plainly relevant to the use of CoFeB in MTJs because (1) they describe annealing and crystallizing CoFeB, EX1060, 308, 310-11; EX1024 ¶¶139-41; and (2) Jimbo’s GMR devices were the predecessor technology “spawning MTJ devices,” as IPB concedes, POR, 67-68.

IPB next argues that “Jimbo does ***not*** teach that CoFeB crystallizes,” POR, 54 (emphasis original), but again is contradicted by Jimbo’s disclosure: “[T]he CoFeB layer is confirmed to be amorphous in the as-deposited state and begin[s] to ***crystallize*** after annealing at 250°C.” EX1060, 311; EX1024 ¶¶61-62. IPB’s effort

to contest these conclusions using Jimbo’s reported diffraction data, POR, 54 (citing EX2053 ¶¶225-28), overlooks that Jimbo reported EXAFS data confirming that cobalt in CoFeB was crystallized by annealing. EX1060, 310 (Co EXAFS data was “very weak” as-deposited, but “[a]fter annealing at 300°C... indicates fcc structure.”); EX1105 ¶24.

IPB also entirely ignores Cardoso’s Figure 3 data with “X-ray measurements... [that] confirmed the CoFeB films are not amorphous” and showed peaks and thus “strong texture enhancement,” corresponding to CoFeB FCC (45.3°). EX1061, 2273, Fig. 3; Pet., 42-43 (citing EX1024 ¶156); *see* POR, 55 (citing EX2053 ¶¶230-33); EX1024 ¶¶61-62.

Jimbo’s and Cardoso’s teachings about crystallization of CoFeB in the (111)-orientation, POR, 52, 54-55, are irrelevant since a skilled artisan understood CoFeB crystallizes in the (001)-orientation when annealed next to MgO(001), as Parkin disclosed. EX1062, 18:49-55; EX1024 ¶61.

IPB next astonishingly claims that “[n]either Bowen, Nagahama nor any other prior art reference of record taught that CoFeB could take on a crystalline (001) structure that would match the MgO(001) layer.” POR, 56. IPB willfully ignores Parkin’s express disclosure that a portion of the CoFeB “storage layer 175... has crystallized and is, moreover, textured in the same orientation as the crystalline [(100)] MgO tunnel barrier.” EX1062, 18:49-60; EX1024 ¶¶61, 145. Both IPB and

Ross acknowledge Parkin’s teachings on this exact point. *See* EX2053 ¶¶94 (quoting EX1062, 18:51-62); POR, 24 (quoting EX1062, 13:3-25: Parkin’s electrodes “are also textured in the (100) orientation”).

IPB’s selective criticism of Klaua’s (EX1045) teachings about the benefit of crystalline MTJ interfaces, POR, 56-57, overlooks how a skilled artisan exercising “ordinary creativity” would incorporate Klaua with their knowledge of CoFeB crystallization and “fit the teachings of multiple [references] together like pieces of a puzzle.” *KSR*, 550 U.S. at 420-21.

IPB does not discredit Wang’s, Hosomi’s, or Cardoso’s teachings that CoFeB was known to increase TMR compared to CoFe and to lower H_f and H_c . *See* POR, 48-49; EX1055, 2269-70; EX1056 ¶¶39, 67-68, 78, 103-04, Fig. 7; EX1061, Abstract; EX1024 ¶¶135, 137. Instead, it argues Bokor conceded the Al_2O_3 barrier layers rendered these references “irrelevant.” POR, 49 (citing EX2017, 148:10-18, 193:5-195:12, 197:22-198:4, 199:23-203:24). The assorted four passages IPB cites have nothing to do with Wang/Hosomi/Cardoso, but whether “hypothetical” data from Slonczewski might apply to Bowen’s MTJ. *See id.* IPB’s cited passages show Bokor said the opposite: he disagreed that findings on Al_2O_3 barriers were entirely “irrelevant” to MgO MTJs. EX2017, 148:10-18 (“I wouldn’t say irrelevant....”).

Finally, IPB does not exempt itself from *KSR*’s familiar elements/predictable results doctrine. *See* POR, 57-58. *KSR* does not demand “seek[ing] out precise

teachings... for a court can take account of the inferences and creative steps [one of skill] in the art would employ.” *KSR*, 550 U.S. at 418. Parkin’s inverted Figure 3A embodiment and teachings about the benefits of crystallized and amorphous CoFeB informed a skilled artisan how the MgO(100) barrier layer would interact with an amorphous CoFeB layer that is subsequently crystallized. EX1062, 18:49-55, 19:10-17; *supra* §I. Simply put, Parkin’s teachings informed a skilled artisan what to expect when replacing Bowen’s or Nagahama’s electrodes with a CoFeB electrode. *See id.*

IV. IPB FAILS TO ADDRESS THE PETITION’S ARGUMENTS FOR CLAIMS 3-4

Claims 3-4 require “entirely crystallized” CoFeB layers. EX1005, 10:30-35. IPB argues the Petition never “allege[d] any prior art reference discloses an entirely crystallized layer comprising CoFeB.” POR, 59. The Petition did: “Parkin disclosed... a portion of the storage layer 175 adjacent to the MgO tunnel barrier 120’ has crystallized” and the TMR “increase[d] substantially on *annealing*.” Pet., 47-48 (emphasis original) (quoting EX1062, 18:47-55, Fig. 5). Ross admits Parkin disclosed a crystallized layer at the interface between the CoFeB layer 175 and the MgO tunnel barrier layer 120’. EX2053 ¶94 (citing EX1062, 18:51-62).

IPB never refutes that Parkin satisfies the “entirely crystallized” limitations in Claims 3-4. POR, 59-60. According to IPB and its expert, “a few monolayers” of

“crystallized” CoFeB adjacent to the MgO barrier in an “otherwise amorphous” CoFeB layer satisfy the “entirely crystallized” claim limitation. EX1101, 185:9-19; *see also id.*, 187:4-188:2; IPR2024-01493, Paper 18, 59-60 (citing EX2053 ¶¶295-96); Pet., 45-48 (quoting EX1072, 6-7). Parkin provides far more disclosure than the ’134 Patent or Yuasa’s APL 2005 publication about crystallization of CoFeB layers. *Compare* EX1062, 18:49-59, *with* EX2006, 2; EX1005, 8:60-66. Bokor also provided testimony about Parkin’s crystallized layer. *E.g.*, EX1024, ¶¶61-62, 144-47, 157-59. Because Parkin’s disclosure of crystallization of a layer of CoFeB is undisputed, no additional expert testimony is required. *E.g.*, *Sundance v. DeMonte Fabricating*, 550 F.3d 1356, 1365 (Fed. Cir. 2008) (“[N]o [expert] testimony was required because there are no underlying factual issues in dispute as to obviousness.”).

V. IPB DOES NOT ESTABLISH NON-OBVIOUSNESS BY SECONDARY CONSIDERATIONS

A. Ross’ Retraction Undermines Alleged Secondary Considerations

“For objective evidence of secondary considerations to be accorded substantial weight, its proponent [IPB] must establish a nexus between the evidence and the merits of the *claimed invention*.” *In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011) (emphasis original) (citation omitted). Ross retracted her alleged nexus between Claims 3-4 of the ’134 Patent and its secondary considerations evidence, undermining IPB’s arguments.

The foundation for IPB and Ross’ secondary considerations argument is that inventor Yuasa’s APL 2005 paper “disclosed the ’134 Patent’s *claimed* device.” POR, 61 (emphasis original); *see also* POR, 61-65, 69-70 (citing EX2006); EX2053 ¶¶258-73. Ross opined that APL’s disclosure provided a “direct nexus” to the alleged secondary considerations evidence. EX2053 ¶261. On the first deposition day, Ross defended her opinion that APL 2005 disclosed the claimed invention, including the “entirely crystallized” limitation. EX1101, 182:3-201:10. But on day two, Ross took it back, stating: “that’s an error.” EX1102, 10:4-19; *see also id.*, 9:17-15:18. She decided that APL 2005 did not, in fact, teach “entirely crystallized” CoFeB electrodes required by Claims 3-4. EX1102, 15:10-18. Ross’ retraction undercuts IPB’s alleged nexus.

B. No Nexus Between The ’134 Claims And Alleged Industry Praise or Long-Felt Need

Even if considered, IPB’s purported industry praise and long-felt need evidence provides no nexus because it’s untethered to the ’134 Patent claims, and/or relates to limitations “already in the prior art.” *Kao*, 639 F.3d at 1069 (quoted POR, 60). By asserting the same secondary considerations that it did for its tunnel barrier height claims in IPR2024-01494, IPB tacitly concedes the lack of any genuine nexus to the ’134 claims. EX1105 ¶¶31-32.

1. APL 2005 Provides No Nexus

IPB asserts “Yuasa disclosed the ’134 Patent’s *claimed* device” in APL 2005, POR, 61 (emphasis original), and that the APL 2005 device received praise for the following four attributes. None establish nexus. EX1105 ¶¶33-36.

a. 230% TMR. IPB does not show nexus between “230% room temperature” TMR and the patent because the claims include neither a TMR nor a temperature requirement. POR, 62-63; EX1005, 10:2-34. IPB offers nothing showing a 230% TMR at room temperature is attributable to the claims. POR, 62-63. The ’134 specification reports a much lower TMR value for its Figure 11 CoFeB MTJs. *See* EX1005, 5:62-6:1 (first embodiment “Fe(001)/MgO(001)/Fe(001) MTJ device”), 7:55-59 (TMR ratio of 88% at room temperature for first embodiment), 9:1-2 (Figure 11 CoFeB MTJ “characteristics are substantially identical to those of the first embodiment.”). The ’134 Patent expressly contradicts IPB’s assertions. *See id.*

In any event, high TMR cannot provide nexus because it was known in the prior art. *Kao*, 639 F.3d at 1069. As Yuasa recognized, Parkin disclosed a “very high TMR value[]” of “*more than 220%*” for his prior art CoFeB MTJ. EX1062, 18:44-51; EX2006, 1 (Yuasa: acknowledging Parkin’s “220% of MR ratio at RT” for CoFeB MTJ).

b. The “claimed method disclosed in APL” solved the crystal growth problem “by using a sputtering deposition technique” to achieve MgO(001) grown over amorphous CoFeB. POR, 63-64. Using a sputtering technique is irrelevant because the ’134 Patent claims a device. *See* EX1005, 10:2-34 (claims). It claims no processing requirement, and the specification provides no disclosure of any crystal-growth problem, let alone a solution. *See id.*, 8:56-9:10 (no description of how to grow MgO(001) in CoFeB embodiment). Unlike APL 2005, the patent discloses no fabrication conditions or steps for MgO(001) on CoFeB. EX2006, 1-2.

c. The “claimed invention disclosed” in APL 2005 “unleashed a new era of skyrocketing TMRs.” POR, 63. The data from Dieny’s chapter 2 does not show that APL 2005 “unleashed” anything. *See* POR, 63 (citing EX1057, 46 (annotated Fig. 2.21)). IPB concedes “Yuasa authored” this chapter, POR, 63, and Yuasa’s self-praise of his own purported invention doesn’t count as objective evidence of non-obviousness. *MRC Innovations v. Hunter Mfg.*, 921 F. Supp. 2d 800, 810 (N.D. Ohio 2013) (“[S]ubjective evidence of obviousness from the point of view of the inventor is not persuasive evidence of nonobviousness.”); *Am. Fireglass v. Moderustic*, 365 F. Supp. 3d 1062, 1081 (S.D. Cal. 2019) (same). APL 2005’s TMR value in the middle of Figure 2.21’s straight line is not an inflection point. *See* POR, 63 (annotated Fig. 2.21).

d. Industry praise for APL 2005. POR, 64-65. Park (EX2005), Gao (EX2022), and TDK (EX2023) identify CoFeB-MgO-CoFeB development in the history of MTJs, but Parkin (EX1062) had already disclosed such MTJs, rendering these references incapable of showing non-obviousness. *Kao*, 639 F.3d at 1069; *see also* EX1062, 22:29-23:30, 24:24-29 (Parkin: (100)-texturing in CoFeB MTJ achieved “the highest possible TMR”).

Fert’s comment on Yuasa’s 2004 *Nature* publication (EX2008), POR, 65 (quoting EX2020), diminishes rather than bolsters the ’134 Patent’s alleged invention because the claims do not encompass the single-crystal Fe/MgO/Fe MTJs Yuasa described in *Nature*, *see* EX2008, Abstract. IPB touts that Yuasa’s “APL paper has been cited more than **1,200** times.” POR, 62. But Yuasa’s chapter credits Parkin’s eminent and earlier 2004 *Nature* publication, POR, 63 (showing “Parkin et al.” in EX1057, Fig. 2.21), which has been cited 4,200 times, EX1103.

2. Yuasa’s Awards Provide No Nexus

IPB next resorts to Yuasa’s CV, presenting his awards with no nexus to the ’134 claims. POR, 65-67 (citing EX2026, EX2028, EX2032-EX2033). IPB’s other cited awards generically reference MgO-CoFeB MTJs and/or processes for manufacturing them. POR, 65-67 (citing EX2024, EX2029-EX2030-EX2031, EX2034-EX2035). These awards lack nexus both because (1) the ’134 Patent neither discloses nor claims them, *supra* §V.B.1(b); and (2) Parkin previously

disclosed MgO-CoFeB MTJs, *supra* §V.B.1(d). IPB also touts a “prize” for Yuasa’s JP5120680, POR, 66 (citing EX2027, EX2055), but it merely claims an MgO(001) layer on a CoFeB layer, EX2055, 1, which Parkin’s inverted Figure 3A embodiment already taught. EX1062, 17:7-10, 19:16-17. If the alleged invention merely constitutes placing MgO atop CoFeB, Parkin’s prior disclosure fully defeats nexus. *See id.*; *Kao*, 639 F.3d at 1069.

3. No Nexus To Any Long-Felt Unmet Need

Finally, IPB never ties the industry’s desire for mass-produced MTJs with higher TMRs to the ’134 claims. *See* POR, 67-71. The ’134 Patent states that Fe-electrode and CoFeB-electrode MTJs had an “identical” 88% TMRs. *Supra* §V.B.1(a); EX1005, 9:1-2. The 230% TMR from APL 2005 that IPB touts, POR, 69, marks no advance over Parkin’s earlier finding of “more than 220%” TMR for CoFeB electrodes, EX1062, 18:44-51. Where both CoFeB electrodes and the resulting high TMR are “already in the prior art,” APL 2005’s statements cannot satisfy any long-felt need. *Id.*; *Kao*, 639 F.3d at 1069. Because the ’134 Patent never claims any manufacturing process, IPB’s alleged manufacturing “breakthrough” is irrelevant. POR, 70; EX1105 ¶¶37-39; *supra* §V.B.1(b).

VI. CONCLUSION

Western Digital requests judgment canceling Claims 1-4 for obviousness.

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that foregoing **PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE** exclusive of the parts exempted as provided in 37 C.F.R. § 42.24, contains 5,595 words and therefore complies with the type-volume limitations of 37 C.F.R. § 42.24.

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CERTIFICATE OF SERVICE

The undersigned certifies that pursuant to 37 C.F.R. § 42.6(e), a true copy of the foregoing **PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE** and **EXHIBITS 1097-1105** are being served electronically on October 8, 2025 to the following counsel for Patent Owner to the following email addresses:

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