

**United States Court of Appeals  
for the Federal Circuit**

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**IDEMITSU KOSAN CO., LTD.,**  
*Appellant*

v.

**SFC CO. LTD.,**  
*Appellee*

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2016-2721

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Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2015-00564.

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Decided: September 15, 2017

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JACOB ANDREW DOUGHTY, Oblon, McClelland, Maier & Neustadt, LLP, Alexandria, VA, argued for appellant. Also represented by RICHARD KELLY, YUKI ONOE.

BLAS P. ARROYO, Alston & Bird LLP, Charlotte, NC, argued for appellee. Also represented by ROBERT FLYNT STREAN.

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Before PROST, *Chief Judge*, O'MALLEY, and CHEN, *Circuit Judges*.

O'MALLEY, *Circuit Judge*.

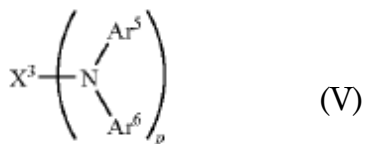
Idemitsu Kosan Co., Ltd. (“Idemitsu”) seeks review of the July 29, 2016 decision of the Patent Trial and Appeal Board (“the Board”) finding claims 1–5, 7–11, 13, and 14 of U.S. Patent No. 8,334,648 (“the ’648 patent”) invalid as obvious over International Publication WO 02/052904 (“Arakane”). *See SFC Co. Ltd. v. Idemitsu Kosan Co., Ltd.*, No. IPR2015-00564, 2016 Pat. App. LEXIS 13340 (P.T.A.B. July 29, 2016). For the following reasons, we affirm.

### I. BACKGROUND

Idemitsu is the owner of the ’648 patent, titled “Organic Electroluminescence Device and Organic Light Emitting Medium.” In brief, the ’648 patent claims a device containing a particular organic medium layered between an anode and cathode; when a voltage is applied through the electrodes, the organic medium emits light. *See* ’648 Patent, at Abstract. Claim 1 is representative:

1. An electroluminescence device comprising a pair of electrodes and a layer of an organic light emitting medium disposed between the pair of electrodes, wherein the layer of an organic light emitting medium is present as a light emitting layer and comprises:

(A) an arylamine compound represented by formula V:



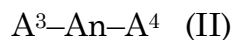
wherein X<sup>3</sup> is a substituted or unsubstituted pyrene residue, Ar<sup>5</sup> and Ar<sup>6</sup> each independently represent a substituted or unsubstituted monovalent

aromatic group having 6 to 40 carbon atoms, and p represents an integer of 1 to 4; and

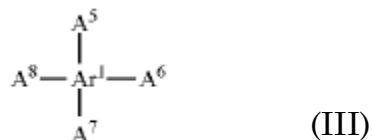
(B) at least one compound selected from the group consisting of anthracene derivatives and spirofluorene derivatives, wherein said anthracene derivatives are represented by formula I:



wherein  $A^1$  and  $A^2$  may be the same or different and each independently represent a substituted or unsubstituted monophenylanthryl group or a substituted or unsubstituted diphenylanthryl group, and L represents a single bond or a divalent bonding group, and by formula II:



wherein An represents a substituted or unsubstituted divalent anthracene residue,  $A^3$  and  $A^4$  may be the same or different and each independently represent a substituted or unsubstituted aryl group having 6 to 40 carbon atoms, at least one of  $A^3$  and  $A^4$  represents a substituted or unsubstituted monovalent condensed aromatic ring group or a substituted or unsubstituted aryl group having 10 or more carbon atoms; and said spirofluorene derivatives are represented by formula III:



wherein  $Ar^1$  represents a substituted or unsubstituted spirofluorene residue,  $A^5$  to  $A^8$  each independently represent a substituted or unsubstituted aryl group having 6 to 40 carbon

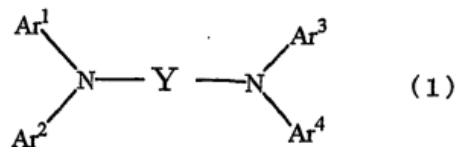
atoms; provided that the organic light emitting medium does not include a styryl aryl compound.

*Id.* at col. 132 ll. 2–64. Claim 13 is the only other independent claim, and covers only the “organic light emitting medium” disclosed by the same formulae above. *Id.* at col. 136 ll. 3–56.

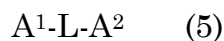
Arakane is also assigned to Idemitsu, and—translated from Japanese into English—is titled “Organic Electroluminescence Device.” Arakane at 1. Like the ’648 patent, Arakane teaches an “organic electroluminescence device”:

The present invention provides an organic electroluminescence device including a pair of electrodes and an organic light emitting medium layer interposed between the electrodes wherein the organic light emitting medium layer has a mixture layer containing (A) at least one hole transporting [“HT”] compound and (B) at least one electron transporting [“ET”] compound and the energy gap Eg1 of the [HT] compound and the energy gap Eg2 of the [ET] compound satisfy the relation  $Eg1 < Eg2$ .

*Id.* at 4. Arakane additionally describes preferred formulae for its HT and ET compounds. Among others, for the HT compound, Arakane discloses an arylamine component with a condensed ring structure:



*Id.* at 5–6. And among others for the ET compound, Arakane discloses an anthracene derivative represented by either of the following formulae:



*Id.* at 18. “A<sup>1</sup> and A<sup>2</sup>, which may be the same or different, each independently represent a substituted or unsubstituted monophenylanthryl group or a substituted or unsubstituted diphenylanthryl group and L represents a single bond or a divalent linking group.” *Id.* The notation “An,” on the other hand, “represents a substituted or unsubstituted anthracene radical and A<sup>3</sup> and A<sup>4</sup>, which may [be] the same or different, each independently represent a substituted C<sub>10</sub>-C<sub>40</sub> monovalent condensed aromatic ring group or a substituted or unsubstituted C<sub>12</sub>-C<sub>40</sub> non-condensed aryl group.” *Id.*

SFC Co. Ltd. (“SFC”) petitioned for inter partes review of all claims (1–15) of the ’648 patent on various grounds, and the Board instituted review on a single ground: whether claims 1–5, 7–11, and 13–14 were obvious over Arakane. *See SFC Co. Ltd. v. Idemitsu Kosan Co., Ltd.*, No. IPR2015-00564, 2015 WL 4760582, at \*8-9 (P.T.A.B. Aug. 7, 2015). The Board ultimately held that all instituted claims were obvious, finding in particular that: (i) Arakane’s formula (1) HT compound corresponds to the ’648 patent’s formula V compound; (ii) Arakane’s formula (5) and (6) ET compounds correspond to the ’648 patent’s formula (I) and (II) compounds, respectively; and (iii) Arakane teaches that a light emitting layer can be formed by combining an HT and ET compound. *Id.* at 13–15, 19–20. Idemitsu timely appealed to this court.

## II. STANDARD OF REVIEW

“Whether a claimed invention is unpatentable as obvious under § 103 is a question of law based on underlying

findings of fact.” *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). Underlying factual findings include: “[t]he identification of analogous prior art,” *In re Bigio*, 381 F.3d 1320, 1324 (Fed. Cir. 2004); “[w]hat the prior art teaches and whether it teaches toward or away from the claimed invention,” *Para-Ordnance Mfg., Inc. v. SGS Importers Int’l, Inc.*, 73 F.3d 1085, 1088 (Fed. Cir. 1995); and the “existence of a reason for a person of ordinary skill to combine references,” *In re Hyon*, 679 F.3d 1363, 1365–66 (Fed. Cir. 2012). The Board’s findings of fact concerning obviousness are reviewed for substantial evidence. *On-Line Careline, Inc. v. Am. Online, Inc.*, 229 F.3d 1080, 1085 (Fed. Cir. 2000).

### III. DISCUSSION

On appeal, Idemitsu does not appear to challenge the Board’s factual findings with respect to the correspondence between the ’648 patent’s components and some of the compounds disclosed by Arakane. Rather, Idemitsu argues that the Board erred in finding that Arakane taught *combining* those particular compounds for the purpose of creating a light emitting layer in an electroluminescent device. See Appellant Br. 25–27. Specifically, Idemitsu claims that Arakane features a requirement that, “when combined in a layer, the HT compound and the ET compound must be selected so that the energy gap of the HT compound is smaller than the energy gap of the ET compound.” *Id.* at 26 (citing Arakane at 4). Idemitsu observes that the Board made no findings with respect to the energy gap relationship of the particular HT/ET combination corresponding to the ’648 patent’s components. *Id.* at 26–27. Hence, Idemitsu argues, the Board must have made one of two erroneous assumptions in order to find that Arakane nevertheless taught the combination thereof: either (1) a skilled artisan would have expected that *all* disclosed HT compounds in Arakane have a lower energy gap than *all* disclosed ET compounds; or (2) Arakane suggests combinations of HT and ET

compounds that *do not satisfy* the energy gap relation in addition to combinations that do. We address each assumption in turn.

We find that the Board plainly did not make the first assumption. The portions of the Board's decision that Idemitsu cites demonstrate that the Board was merely restating SFC's argument—not adopting it:

In response to Patent Owner's arguments regarding an alleged energy gap requirement, *Petitioner takes the position that Arakane "tells you [that] you want this preferred energy gap relationship, and then it tells you these are the compounds to use, [and] that presumptively those compounds have that desired energy gap relationship."* Tr. 45:7–13; *see id.* at 44:17–23, 47:4–7 (agreeing that it is reasonable to read Arakane's disclosure as saying "if you take any one of these As and any one of these Bs and put them together, it will work"). Petitioner further contends that Patent Owner's reliance on Comparative Example 4 is misplaced, because Comparative Example 4 utilizes a hole transporting compound (TPD) that does not fall within Arakane's preferred group of hole transporting compounds, i.e., it is not an aromatic amine having a condensed ring structure. Reply 12. In contrast, Examples 1–4 utilize preferred hole transporting compounds. *Id.*

*Idemitsu*, 2016 Pat. App. LEXIS 13340, at \*24-25 (emphasis added). But the Board itself took a different approach:

Claims 1 and 13 of the '648 patent require the combination of components (A) and (B) in a light emitting layer. Claims 1 and 13 do not include any limitations directed to the energy gap characteristics of the individual components or particular performance characteristics of the light emitting layer, such as half-life or efficiency.

Thus, the “claimed invention as a whole” is the combination of the recited components in a light emitting layer. As discussed in detail below, Arakane’s disclosure would have informed an ordinary artisan that combining components (A) and (B) would produce a light emitting layer. The sufficiency of that disclosure to establish the obviousness of the combination *does not depend on whether the resulting light emitting layer would satisfy Arakane’s energy gap relationship* or the desired stability and heat resistance criteria.

*Id.* at \*25-26 (emphasis added); *see also id.* at \*27 (“This teaching regarding the energy gap relationship, however, does not diminish Arakane’s disclosure of the fundamental concept of forming a light emitting layer containing a mixture of at least two components, (A) a hole transporting compound and (B) an electron transporting compound.”). In other words, the Board found that Arakane teaches that combining any of the listed HT compounds with any of the ET compounds would produce a light emitting layer, and that—if the combination *additionally* satisfies the energy gap relationship—then it will feature improved durability and efficiency as well. *Id.* at \*27-29.

The Board, if it made any assumption, made the second one Idemitsu describes: finding that Arakane suggests combinations of HT and ET compounds that do not satisfy the energy gap relation in addition to combinations that do. More precisely, it found that Arakane suggests combinations of HT and ET compounds that produce a light emitting layer, regardless of their energy gap relation. We discern no error in that finding.

Idemitsu first contends that this argument was “raised too late,” because it “d[id] not appear in SFC’s petition or the [Board]’s institution decision.” Appellant Br. 37–38. Idemitsu’s contention misconstrues not only the record, but our case law as well. A review of the



proceedings below reveals the following chain of arguments and counterarguments. First, SFC argued in its petition that “Arakane teaches (i) that the [HT] compound can be an arylamine compound corresponding to Formula (V) of claims 1 and 13, (ii) that the [ET] compound can be anthracene derivatives corresponding to Formulas (I) and (II) of claims 1 and 13, and (iii) that the [HT] compound and [ET] compound are mixed in the organic light emitting medium.” J.A. 15–16; *see also* J.A. 189–91. Second, Idemitsu argued in its response that SFC failed to “explain why a skilled artisan would have been led to use” that combination, given that “[t]he energy gap relationship limits the combinations of the compounds . . . encompassed by Arakane to combinations satisfying the relationship.” J.A. 328. Third, SFC countered in its reply that Arakane does not teach away from “the claimed combination,” despite “the absence of demonstrating that the combination would possess the preferred energy gap relationship,” distinguishing certain comparative examples. J.A. 382–83; *see also* *Idemitsu*, 2016 Pat. App. LEXIS 13340, at \*24-25.

This back-and-forth shows that what Idemitsu characterizes as an argument raised “too late” is simply the by-product of one party necessarily getting the last word. If anything, *Idemitsu* is the party that first raised this issue, by arguing—at least implicitly—that Arakane teaches away from non-energy-gap combinations. SFC simply countered, as it was entitled to do. To the extent Idemitsu suggests that the Board could not reach a counterargument because it was not preemptively addressed by the petition or institution decision, Idemitsu is plainly mistaken. *See Genzyme Therapeutic Prod. Ltd. P’ship v. Biomarin Pharm. Inc.*, 825 F.3d 1360, 1366 (Fed. Cir. 2016) (“There is no requirement, either in the Board’s regulations, in the APA, or as a matter of due process, for the institution decision to anticipate and set forth every

legal or factual issue that might arise in the course of the trial.”).

Idemitsu’s only substantive argument on appeal appears to be that the Board should not have engaged in fact-finding on this issue without the benefit of additional extrinsic evidence, such as expert testimony. *See, e.g.*, Appellant Br. 43–44. In some cases, that method of fact-finding could indeed be problematic. *See, e.g.*, *Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1330 (Fed. Cir. 2009) (“If the relevant technology were complex, the court might require expert opinions.”); *Proveris Sci. Corp. v. Innovasystems, Inc.*, 536 F.3d 1256, 1267 (Fed. Cir. 2008) (affirming the district court’s requirement of expert testimony to prove invalidity where “th[e] subject matter [wa]s sufficiently complex to fall beyond the grasp of an ordinary layperson”); *Brand v. Miller*, 487 F.3d 862, 869–70 (Fed. Cir. 2007) (reversing the Board’s decision to “reject[] as unconvincing the only relevant testimony” and independently reach the opposite conclusion).

But here, Idemitsu provided no such supporting evidence for its own position—that Arakane teaches away from any non-energy-gap HT/ET combinations. SFC, of course, bears the ultimate burden of establishing unpatentability, but it is not required as a matter of law to rebut mere *attorney argument* with *expert testimony* in order to satisfy that burden. The Board weighed the parties’ competing arguments—each relying solely on the text of Arakane itself—and found SFC’s reading to be the more plausible one. That is precisely what the Board is supposed to do.

Idemitsu’s teaching away argument is of questionable relevance anyway. Evidence concerning whether the prior art teaches away from a given invention must relate to and be commensurate in scope with the ultimate claims at issue. *See, e.g.*, *MeadWestVaco Corp. v. Rexam Beauty and Closures, Inc.*, 731 F.3d 1258, 1264–65 (Fed. Cir.

2013); *In re Kahn*, 441 F.3d 977, 990 (Fed. Cir. 2006); *In re Zhang*, 654 F. App'x 488, 490 (Fed. Cir. 2016) (“While a prior art reference may indicate that a particular combination is undesirable for its own purposes, the reference can nevertheless teach that combination if it remains suitable *for the claimed invention*.”) (emphasis added). Here, it is undisputed that the claims at issue do not include limitations with respect to half-life or efficiency. *See, e.g., Idemitsu*, 2016 Pat. App. LEXIS 13340, at \*26; Appellee Br. 46. Hence, if Arakane teaches that the only drawback of non-energy-gap HT/ET combinations is poor performance under those criteria, it is of substantially reduced importance here.

Nor, as Idemitsu suggests, was the Board’s finding unreasonable on the merits. Arakane’s abstract reads as follows:

An organic electroluminescence device includes a pair of electrodes and an organic luminescent medium layer interposed between the electrodes. *The organic luminescent medium layer has a mixture layer containing (A) at least one hole transporting compound and (B) at least one electron transporting compound.* The energy gap Eg1 of the hole transporting compound and the energy gap Eg2 of the electron transporting compound satisfy the relation  $Eg1 < Eg2$ . *Electrons recombine with holes in the organic luminescent medium layer to produce light.* The organic electroluminescence device has a long life and emits light with high efficiency.

Arakane at 1 (emphases added). The syntactical structure is revealing. Arakane’s teaching to combine an HT compound with an ET compound is separate from its description of the energy gap; the teaching that hole recombination produces light is separate from the durability and efficiency description. This is mirrored, moreover,

elsewhere in the description—which explicitly pegs the longer life and efficiency to the energy gap:

*As a result*, the present inventors have found that when an organic EL device includes an organic light emitting medium layer having a mixture layer containing (A) at least one hole transporting compound whose energy gap E1 is smaller and (B) at least one electron transporting compound whose energy gap Eg2 is larger, *it has a longer life and can emit light with higher efficiency than conventional organic EL devices.*

*Id.* at 3–4 (emphases added). “[C]onventional organic [electroluminescent] devices” are described in the preceding paragraphs, and broadly include those with HT/ET combination media. *Id.* at 2–3. Thus, the Board reasonably concluded that Arakane teaches that a light-producing device can be made—regardless of comparative shortcomings in durability or resistance caused by imperfect energy gap ratio—by combining HT and ET compounds, including the claimed combinations, as the critical layer.

#### IV. CONCLUSION

After full review of the record and careful consideration, we find no error in the Board’s decision. Accordingly, we affirm.

#### **AFFIRMED**

#### COSTS

No costs.