

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TCT MOBILE (US) INC; TCL CHINA STAR OPTOELECTRONICS
TECHNOLOGY CO., LTD; TCL TECHNOLOGY GROUP
CORPORATION; TTE TECHNOLOGY, INC.; TCL COMMUNICATION
TECHNOLOGY HOLDINGS LIMITED; and TCT MOBILE, INC.,
Petitioners,

v.

SEMICONDUCTOR ENERGY LABORATORY CO., LTD.,
Patent Owner.

IPR2021-01573
Patent 7,372,199 B2

Before DAVID C. McKONE, JENNIFER MEYER CHAGNON, and
NATHAN A. ENGELS, *Administrative Patent Judges*.

ENGELS, *Administrative Patent Judge*.

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

I. INTRODUCTION

Petitioner filed a Petition for *inter partes* review of claims 1, 4, 5, 8, 9, 12, 13, and 16 of U.S. Patent No. 7,372,199 B2 (Ex. 1001, “the ’199 patent”). Paper 1 (“Pet.”), 1. Patent Owner filed a Preliminary Response. Paper 12 (“Prelim. Resp.”).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in the Petition and any response thereto shows “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018). We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a).

For the reasons set forth below, upon considering the parties’ arguments and the evidence of record, we conclude that the information presented in the Petition fails to establish a reasonable likelihood that Petitioner would prevail in showing the unpatentability of any of the challenged claims. Accordingly, we decline to institute *inter partes* review.

A. Real Parties in Interest

The parties identify the entities listed on the caption page as the real parties in interest. Pet. 3; Paper 10, 1.

B. Related Matters

The parties indicate that the ’199 patent is the subject of *Semiconductor Energy Laboratory Co. v. TCL China Star Optoelectronics Technology Co.*, Case No. 8:21-cv-00554 (C.D. Cal.) and *Semiconductor Energy Laboratory Co. v. BOE Technology Group Co.*, Case No. 3:20-cv-04297 (N.D. Cal.). Pet. 3–4, Paper 10, 1.

C. The Challenged Patent

Titled “Light Emitting Device and Image Playback Device Having Triplet and Singlet Compounds in Electroluminescent Layer,” the ’199 patent describes a light emitting element that uses an organic compound capable of electro luminescence (“EL”). Ex. 1001, 1:9–17, code (54). The ’199 patent describes having an “EL layer” comprising, at least, a hole transporting layer, a light emitting layer, and an electron transporting layer. Ex. 1001, 1:19–46. The layers of the EL layer are formed between an anode and a cathode, collectively forming an “EL element.” *Id.*

According to the ’199 patent, “a plurality of EL elements formed in a pixel portion on the same substrate include EL elements whose EL layers contain luminous materials emitting low luminance light (singlet compound) and EL elements whose EL layers contain triplet compounds capable of emitting high luminance [l]ight with a low voltage.” Ex. 1001, 2:18–24. “The two types of EL elements are combined and formed in each of the pixels” shown in Figure 1A, reproduced below.

Fig. 1A

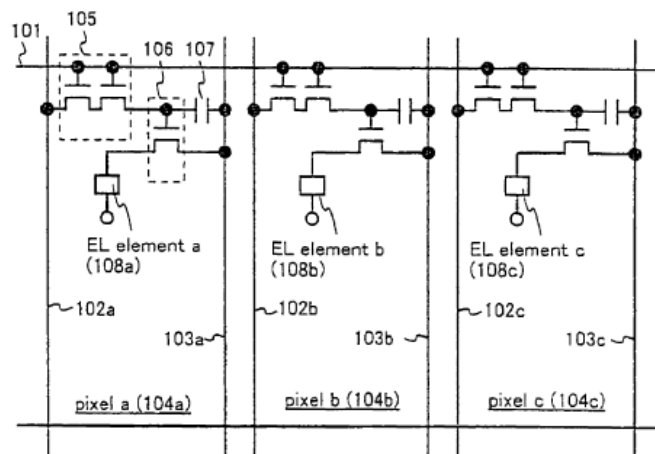


Figure 1A, above, shows “a circuit structure of a pixel portion” of the invention of the ’199 patent. Ex. 1001, 2:29–30. “By using the two types of EL elements in a strategically planned combination, the present invention makes it possible to control and equalize the luminance of light emitted from the plural EL elements as well as reduce the power consumption of the EL elements.” Ex. 1001, 2:24–28. For example,

When three color pixel display is intended, . . . if the luminance of light emitted from a luminous material for lighting the pixel a (104a) in one color is lower than the luminance of light of [the] other two colors for respectively lighting the pixel b (104b) and the pixel c (104c), a triplet compound is used in the light emitting layer of the EL element a (108a) while singlet compounds are used in the light emitting layers of the EL elements b and c (108b and 108c).

Ex. 1001, 3:25–34. Or, as another example:

If the luminance of light of two colors for respectively lighting the pixel a (104a) and the pixel b (104b) is lower than the luminance of light of one color for lighting the pixel c (104c), triplet compounds are used in the light emitting layers of the EL element a (108a) and the EL element b (108b) while a singlet compound is used in the light emitting layer of the EL element c (108c).

Id. at 3:35–41; *see also id.* at 17:44–61 (discussing Embodiment 3, Figure 12, which similarly includes one EL element using a singlet compound and two EL elements using a triplet compound).

The ’199 patent also describes including additional hole transport layer(s) (e.g., “hole transporting layer 2 (130)” in Figure 2B) in the laminate structure of the EL element. *Id.* at 5:4–7; *see also id.* at 5:26–27 (“Preferably, the laminate structure has two to five [hole transport] layers.”). According to the ’199 patent, including the additional hole transport layer(s)

“facilitates movement of holes from the hole injection layer to the hole transporting [l]ayer, and the EL element can have a high luminance with a low voltage as a result.” *Id.* at 5:15–18. This benefit occurs due to a reduction in the difference in HOMO level¹ between the hole injection layer and the hole transporting layer. *See id.* at 5:10–26.

D. The Challenged Claims

Petitioner challenges claims 1, 4, 5, 8, 9, 12, 13, and 16 of the ’199 patent. Pet. 5. Claim 1 is illustrative of the challenged claims and is reproduced below.

1. A light emitting device comprising:
 - [1.1] a substrate;
 - [1.2] a first EL element over the substrate; and
 - [1.3] a second EL element over the substrate,
 - [1.4] wherein the first EL element comprises a first EL layer comprising a triplet compound,
 - [1.5] wherein the second EL element comprises a second EL layer comprising a singlet compound, and
 - [1.6] wherein at least one of the first and second EL layers comprises a plurality of hole transporting layers.

E. Grounds

Petitioner asserts the following grounds of unpatentability:

Claims Challenged	35 U.S.C. § ²	Reference(s)
1, 4	102	Adachi ³

¹ HOMO level refers to “highest occupied molecular orbital (HOMO) energy level.” Ex. 1002 ¶ 36.

² The application resulting in the ’199 patent claims priority to a date prior to when the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), took effect. Thus, we refer to the pre-AIA versions of § 102 and § 103.

³ US 6,458,475 B1, filed Nov. 24, 1999. Ex. 1003.

Claims Challenged	35 U.S.C. § ²	Reference(s)
5, 8	103	Adachi, Shiba, ⁴ Ozawa ⁵
9, 12	103	Adachi, Shiba
13, 16	103	Adachi, Kanda ⁶

Pet. 10. Petitioner also filed the Declaration of Jerzy Kanicki, Ph.D. (Ex. 1002) in support of its contentions.

II. ANALYSIS

A. Adachi

Titled “Organic Light Emitting Diode Having a Blue Phosphorescent Molecule as an Emitter,” Adachi “is directed to the use of complexes of metals, including zinc, as dopants in a host layer comprising to function as an emitter layer in organic light emitting diodes.” Ex. 1003, 2:63–65, code (54). Adachi states that use of doped forms of zinc-based compounds provide phosphorescent blue emission suitable for use in OLEDs, while neat (i.e., undoped) film forms of the same compound produced broad emission ranging from blue to yellow regions. Ex. 1003, 3:6–11. We discuss relevant portions of Adachi further below.

B. Petitioner’s Assertions Regarding Adachi

1. Claim 1: “triplet compound” and “singlet compound”

Arguing that Adachi anticipates claim 1, Petitioner cites Adachi as disclosing the claimed first and second EL elements, each EL element being comprised of films stacked between an anode and a cathode over a glass substrate. Pet. 26–27 (citing Ex. 1003, 13:13–24). In particular, Petitioner

⁴ US 5,684,555, issued Nov. 4, 1997. Ex. 1004.

⁵ US 6,522,315 B2, published Aug. 20, 1998. Ex. 1005.

⁶ EP 0,917,359 A1, published May 19, 1999. Ex. 1006.

cites Adachi as teaching EL layers comprised of “a thin film of the organometallic doped into a host matrix . . . deposited to form an emitting layer.” Pet. 26. For the triplet compound and singlet compound recited in claim elements [1.4] and [1.5], Petitioner cites Adachi as describing “that the doped layer comprises a green phosphorescent (triplet) dye and a red fluorescent (singlet) dye.” Pet. 27–28 (citing Ex. 1003, 4:47–60).

Petitioner relies primarily on Adachi’s Example 1, at column 13, lines 13–24, to show the first and second EL elements and first and second EL layers. *Id.* at 26–29. This Example 1, however, does not include the green and red dyes that Petitioner maps to the triplet and singlet compounds. Ex. 1003, 13:50–15:37. Rather, Petitioner cites to a different reference to an “Example 1 of this application” in Adachi’s “General Background” section, described at Exhibit 1003, column 4, line 44 to column 5, line 15. Pet. 27–29. Petitioner appears to argue that these two instances of Example 1 should be read together as a single embodiment, resulting in anticipatory disclosure. *Id.* at 25–29.

As Patent Owner points out, however, Adachi’s General Background’s reference to “Example 1 of this application” does not correspond to the Example 1 described later in Adachi’s Detailed Description of the Invention. Prelim. Resp. 19–24. Rather, the General Background’s reference to Example 1 appears to be copied from the background of a different patent assigned to a common assignee with Adachi, namely, Forrest (U.S. Patent No. 6,310,360 B1 (Ex. 2001)). Prelim. Resp. 21 (noting verbatim language in patent issued to Adachi’s co-inventor; comparing Ex. 1003, 4:48–60, with Ex. 2001, 4:49–65).

Indeed, throughout its disclosure and in the only complete embodiments disclosed in its specification, Adachi describes using zinc-based compounds that show blue fluorescence and phosphorescence. Ex. 1003, 2:63–65, 3:6–11 (“We examined the use of neat films of $\text{Zn}(\text{BOX})_2$; however . . . the present invention on doped forms is the only report of phosphorescent blue emissions suitable for use in OLEDs.”), 3:33–35 (“[i]n one embodiment of the present invention, a $\text{Zn}(\text{BOX})$ compound is used as a dopant . . . in a CBP host”), 8:14–22 (describing use of a heavy metal atom along with blue emitting ligands), 9:37–39 (“The invention is exemplified for the metal Zn, and it is expected useful results are obtained for Os, Ir, and Pt compounds with BOX and analogous derivatives.”), 13:13–15:37 (describing “Example 1” as a device having the organometallic dopant $\text{Zn}(\text{BOX})_2$), 15:39–16:31 (describing “Example 2” as a device using $\text{Zn}(\text{BOX})_2$ in the emitter layer), codes (54), (57).

As such, Petitioner relies on portions of two distinct types of devices, (1) Adachi’s embodiments disclosing blue phosphorescent OLEDs as described in columns 13–16, and (2) the red fluorescent OLED mentioned in Adachi’s background discussion. This is not appropriate in an anticipation analysis. *See Net MoneyIn, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369–71 (Fed. Cir. 2008) (explaining that anticipation requires a clear disclosure of the claimed invention with elements arranged as in the claim and without any need for combining distinct disclosures).

Further still, Petitioner appears to allege that Adachi discloses that the triplet and singlet dye are in the same EL layer. *See* Pet. 28 (“[Adachi] also describes that *the doped layer* comprises a green phosphorescent (triplet) dye *and* a red fluorescent (singlet) dye.” (emphases added) (citing Ex. 1003,

4:47–60; Ex. 1002 ¶ 174)). The claim, however, requires that “the first EL element comprises a first EL layer comprising a triplet compound” and “the second EL element comprises a second EL layer comprising a singlet compound.” In other words, the triplet and singlet dyes are not found in the same EL layer of the claimed device, but in the separate EL layers of the first and second EL elements, respectively. *See* Ex. 1001, 3:15–41, 17:44–61, Figs. 1B, 12. Petitioner does not allege that Adachi teaches this feature. *See* Pet. 28 (“[Adachi] also describes that *the doped layer* comprises a green phosphorescent (triplet) dye and a red fluorescent (singlet) dye.” (emphasis added)), 29 (same).

For these reasons, we are not persuaded that Petitioner has shown that Adachi discloses the claimed first and second EL elements comprising first and second EL layers, respectively comprising a triplet compound and a singlet compound. Therefore, Petitioner has not shown a reasonable likelihood that it would prevail in establishing that Adachi anticipates claim 1.

2. Claim 1: “plurality of hole transporting layers”

In addition, Petitioner fails to show that Adachi discloses “a plurality of hole transporting layers,” as recited in limitation [1.6]. Petitioner cites Adachi’s statement that “a basic heterostructure ‘typically has at least one electron transporting layer and at least one hole transporting layer’” (Pet. 30 (quoting Ex. 1003, 6:21–23)), but that statement in Adachi’s “Background of Materials” section merely describes heterostructures in general. Even considering Petitioner’s reliance (Pet. 30) on Dr. Kanicki’s statement that a person of ordinary skill “would have understood that emitter layers in OLEDs work as hole transporting layers” (Ex. 1002 ¶ 186), Petitioner does

not persuasively explain how Adachi discloses an embodiment that expressly or inherently includes “a *plurality* of hole transporting layers” as claimed (as opposed to a *single* hole transporting layer). For this additional reason, Petitioner has not shown a reasonable likelihood that it would prevail in establishing that Adachi anticipates claim 1.

3. Claims 4, 5, 8, 9, 12, 13, and 16

Petitioner relies on its showings regarding claim 1 for its challenge to independent claim 5. Pet. 37–48. In particular, Petitioner relies exclusively on its showing from claim 1 for elements [5.6] (which corresponds to elements [1.2] and [1.3]), [5.7] (which corresponds to element [1.4]), [5.8] (which corresponds to element [1.5]), [5.9] (which corresponds to element [1.6]). Pet. 45–46. Petitioner’s showing on claim elements [1.4], [1.5], and [1.6] is deficient for the reasons discussed above. Accordingly, Petitioner has not shown a reasonable likelihood that it would prevail regarding its challenge to claim 5.

Claims 4, 8, 9, 12, 13, and 16 depend from one of claim 1 and 5. In discussing these claims, Petitioner does not allege that any secondary reference cures the deficiencies in Adachi discussed above. *See* Pet. 30–37, 48–62. Accordingly, Petitioner also has not shown a reasonable likelihood that it would prevail regarding its challenge to any of dependent claims 4, 8, 9, 12, 13, and 16.

C. Discretionary Denial

Because we deny the Petition on the merits, we do not reach the issues of discretionary denial. *See* Pet. 62–63; Prelim. Resp. 38–54.

III. CONCLUSION

For the foregoing reasons, we are not persuaded that the Petition establishes a reasonable likelihood that Petitioner would prevail in any of its challenges to claims 1, 4, 5, 8, 9, 12, 13, and 16 of the '199 patent.

IV. ORDER

In consideration of the foregoing, it is hereby ordered that the Petition is *denied*, and no trial is instituted.

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