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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* HANS-HELMUT BECHTEL and MATTHIAS HEIDEMANN

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Appeal 2018-004798  
Application 15/195,817<sup>1</sup>  
Technology Center 2800

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Before KAREN M. HASTINGS, JAMES C. HOUSEL, and  
JEFFREY R. SNAY, *Administrative Patent Judges*.

HASTINGS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants seek our review under 35 U.S.C. § 134(a) of the  
Examiner's decision rejecting claims 1–15.

We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> Appellants identify the real parties in interest as Koninklijke Philips N.V.  
and Lumileds LLC (Appeal Br. 2).

Independent claim 1 below is illustrative of the subject matter on appeal (emphasis added):

1. A device comprising:
  - a light source emitting a first spectral distribution having a first peak wavelength in the blue spectral range,
  - a first luminescent material configured for absorbing a portion of the light of the first spectral distribution and for converting at least a portion of the absorbed light into light of a second spectral distribution, the second spectral distribution having a second peak wavelength in the green spectral range,
  - a second luminescent material configured for absorbing a portion of the light of the first spectral distribution and/or a portion of the second spectral distribution and for converting at least a portion of the absorbed light into light of a third spectral distribution, the third spectral distribution having a third spectral width and having a third peak wavelength,
  - a third luminescent material configured for absorbing a portion of the light of at least one of the first spectral distribution, second spectral distribution, and the third spectral distribution and for converting at least a portion of the absorbed light into light of a fourth spectral distribution, the fourth spectral distribution having a fourth spectral width and having a fourth peak wavelength,
  - wherein the third peak wavelength and the fourth peak wavelength are in the orange/red spectral range, and *wherein the third luminescent material comprises particles showing quantum confinement and having at least in one dimension a size in the nanometer range.*

The Examiner maintains the following rejections:<sup>2</sup>

- (a) claims 1–15 on the ground of nonstatutory double patenting as being unpatentable over claims 1–16 of U.S. Application No. 14/419,951; and

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<sup>2</sup> We refer to the Specification filed June 28, 2016 (“Spec.”), the Final Office Action dated July 6, 2017 (“Final Act”), the Appeal Brief filed Jan.

(b) claims 1–15 under 35 U.S.C. § 102(a)/(e) as being anticipated by Zhang et al. (US 2011/0227476 A1, published Sept. 22, 2011) (“Zhang”).

## ANALYSIS

### *Double Patenting Rejection*

Claims 1–15 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1–16 of U.S. Application No. 14/419,951.

As an initial matter, we note that U.S. Application No. 14/419,951 issued as US 9,406,849 B2 on August 2, 2016, which was prior to the date the Final Action was mailed.

Appellants do not present arguments for this rejection. Therefore, we summarily affirm the double patenting rejection of claims 1–15.

### *§ 102 Rejection Zhang*

Claims 1–15 are rejected under 35 U.S.C. § 102(a)/(e) as being anticipated by Zhang.

Appellants’ principle argument on appeal is that Zhang does not disclose a third luminescent material that comprises particles showing quantum confinement and having, at least in one dimension, a size in the nanometer range, as recited in claim 1 (Appeal Br. 5). Specifically, Appellants assert Zhang does not disclose quantum confinement, does not disclose quantum dots or any other material exhibiting quantum confinement, and although Zhang discloses phosphor powder having a size

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23, 2018 (“Appeal Br.”), the Examiner’s Answer dated Feb. 9, 2018 (“Ans.”), and the Reply Brief filed Apr. 5, 2018 (“Reply Br.”).

of less than about 200 nm, Zhang does not disclose the phosphor powder exhibits quantum confinement, Zhang does not disclose the phosphor powder has optical properties that depend on the size of the particles, and Zhang's powder is not a quantum dot material, which has a much smaller size than the powder disclosed by Zhang (*id.* at 5–8; Reply Br. 1–3).

As an initial matter, we construe the limitation “quantum confinement” of claim 1 to determine its scope and meaning.

“During examination, ‘claims ... are to be given their broadest reasonable interpretation consistent with the specification, and . . . claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art’” (*In re Am. Acad., of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004) (quoting *In re Bond*, 910 F.2d 831, 833 (Fed. Cir. 1990))). Paragraph 18 of the Specification states the following (emphases added):

*Quantum confinement means that the particles have optical properties that depend on the size of the particles. Examples of such materials are quantum dots, quantum rods and quantum tetrapods. The third luminescent material comprises at least particles that have at least in one dimension a size in the nanometer range. This means, for example, that, if the particles are substantially spherical, their diameter is in the nanometer range. Or, this means, for example, if they are wire-shaped, that a size of a cross-section of the wire is in one direction in the nanometer range. A size in the nanometer range means that their size is at least smaller than 1 micrometer, thus, smaller than 500 nanometer, and larger or equal to 0.5 nanometer. In an embodiment, the size in one dimension is smaller than 50 nanometer. In another embodiment the size in one dimension is in the range from 2 to 30 nanometer.*

When considered in isolation, the first sentence of the above passage would simply define “quantum confinement” as particles having optical

properties that depend on their size. This definition appears to be broad because it indicates that particles of *any* size that vary *any* optical property when their size changes in *any* amount would exhibit quantum confinement. The above passage, however, also discusses particles having a size “in the nanometer range,” as recited in claim 1. Therefore, it is unclear from the above passage whether “quantum confinement” occurs for particles of any size or only those having “a size in the nanometer range.”

Appellants’ arguments illustrate this issue. Appellants argue the Examiner conflates the “quantum confinement” limitation of claim 1 and the “size in the nanometer range” limitation of claim 1 (Reply Br. 2). However, Appellants further contend:

The present specification teaches “quantum confinement means that the particles have optical properties that depend on the size of the particles.” Practically speaking, quantum confinement means that, for a given composition, smaller sized particles (for example, 2-3 nm sized particles) emit light at shorter wavelengths whereas larger sized particles (for example, 5-6 nm sized particles) emit light at longer wavelengths.

(*Id.* at 3). Therefore, Appellants’ arguments indicate the phenomenon of quantum confinement is restricted to particles having a smaller size.

Because Appellants’ disclosure does not clearly set forth how one of ordinary skill in the art would understand the limitation “quantum confinement,” we turn to extrinsic sources to determine how one of ordinary skill in the art would understand this limitation.<sup>3</sup>

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<sup>3</sup> “The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005). In many cases, courts look to public sources to demonstrate what one of ordinary skill in the art would have understood disputed claim language to

One reference entitled “Quantum confinement,”<sup>4</sup> dated October 30, 2006, states “[q]uantum confinement is change [sic] of electronic and optical properties when the material sampled is of sufficiently small size - typically 10 nanometers or less.” Thus, not only does quantum confinement cause a change in optical properties, as stated in paragraph 18 of Appellants’ Specification, but this occurs for materials of a “small size,” not materials of any particle size. The reference indicates that such a “small size” is for materials in the nanometer range by stating the size is “typically 10 nanometers or less” and by discussing crystal sizes on the order of 3.6 nm and 6–7 nm. In other words, when a material is of a sufficiently small size, the material may exhibit quantum confinement.

Further, paragraph 54 of Vlahovic et al. (US 2009/0321261 A1, published Dec. 31, 2009) (“Vlahovic”) states (emphases added):

The quantum confinement effect occurs when electron and hole pairs are spatially confined within the nanostructure. *When the size of a nanostructure is on the level of a hundred nanometers or less the confinement breaks the periodic potential, and thereby collapses the energy “bands” into separated energy levels.* The energy level distribution in such nanostructures becomes discontinuous, since the charges cannot obtain arbitrary energy values but rather only discrete ones. *The energy level distribution and other material properties in such nanostructures depend, among other factors, on the size and the shape of the*

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mean. *Id.* at 1314. Such sources include “the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.” *Id.* (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)).

<sup>4</sup> <http://phycomp.technion.ac.il/~anastasy/thesis/node10.html> (last visited January 24, 2019).

*nanostructures.*

Thus, Vlahovic also indicates that one of ordinary skill in the art would have understood “quantum confinement” as a phenomenon that causes material properties to depend upon the size of a material and quantum confinement can occur when a material is nano-sized, such as a size on the order of a hundred nanometers or less.

In view of the above, we interpret “quantum confinement” as a property that can be exhibited by a material that is nano-sized (not merely any size), which is exhibited as optical properties that vary with particle size. As for the particular size of the material, claim 1 recites that the third luminescent material comprises particles “having at least in one dimension a size in the nanometer range.” As noted above, paragraph 18 of the Specification defines this limitation by stating “[a] size in the nanometer range means that their size is at least smaller than 1 micrometer, thus, smaller than 500 nanometer, and larger or equal to 0.5 nanometer.”

Having construed the disputed limitation of claim 1, we next analyze the § 102 rejection of claim 1. The Examiner finds Zhang discloses a third luminescent material comprising particles having at least one dimension of a size in the nanometer range because Zhang discloses a “second phosphor 40” comprising particles of a size less than about 200 nm (Final Act. 5–6; Ans. 3).

Zhang discloses the second phosphor can be formed of a powder having an average particle size of less than about 200 nm. Zhang ¶ 40. Because the particle size range disclosed by Zhang includes sizes less than 200 nm, Zhang’s particle size encompasses the “size in the nanometer range” defined in paragraph 18 of the Specification (i.e., “at least smaller

than 1 micrometer, thus, smaller than 500 nanometer, and larger or equal to 0.5 nanometer”) and even the sizes of “several nanometers” asserted by Appellants (Appeal Br. 8). As a result, the Examiner’s findings are supported by Zhang’s disclosure, which sets forth a reasonable basis that the claimed property of “quantum confinement” is inherent to Zhang’s nano-size phosphor powder particles. Thus, the Examiner has set forth a prima facie case of anticipation and Appellants’ arguments do not identify a reversible error in the Examiner’s rejection.

Where patentability rests upon a property of the claimed material not disclosed within the art, the PTO has no reasonable method of determining whether there is, in fact, a patentable difference between the prior art materials and the claimed material (*In re Best*, 562 F.2d 1252, 1255 (CCPA 1977)). Once the Examiner provides a reasonable basis to believe that the characteristic is inherent, the burden shifts to the applicant to prove that the prior art products do not necessarily possess the characteristics of his claimed product (*id.* at 125–55 (discussing *In re Swinehart*, 439 F.2d 210 (CCPA 1971) and *In re Ludtke*, 441 F.2d 660 (CCPA 1971))).

Here, Appellants assert that specific exemplary phosphors disclosed by Zhang would exhibit the same optical properties at particles sizes of 200 nm and 500 nm (Reply Br. 3–4). These arguments are unpersuasive because they are mere attorney argument without citation to evidence or persuasive technical reasoning (*see In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) (“Attorney’s argument in a brief cannot take the place of evidence.”)). In other words, Appellants have not met their burden of proving that the various materials disclosed by Zhang for the second phosphor (Zhang ¶¶ 24–25) including those of *less than* 200 nm in size would not necessarily

possess quantum confinement or that the Examiner otherwise reversibly erred in the rejection of claim 1.

Appellants do not argue claims 2, 3, 5, 6, 8–11, 13, and 15 separately from claim 1 (Appeal Br. 5–9).

Appellants set forth separate arguments for claims 4, 7, 12, and 14 (Appeal Br. 8–9). These arguments, however, consist of quoting the limitations of claims 4, 7, 12, and 14 and arguing the portions of Zhang cited by the Examiner do not disclose the limitations.

Such “separate” arguments, however, amount to no more than a quotation of the additional limitations of claims 4, 7, 12, and 14 and a generic denial that the portions of Zhang cited by the Examiner teach the additional limitations. We and our reviewing court have long held that such “argument” does not merit separate consideration (*see, e.g., In re Lovin*, 652 F.3d 1349, 1357 (Fed. Cir. 2011) (“[W]e hold that the Board reasonably interpreted Rule 41.37 to require more substantive arguments in an appeal brief than a mere recitation of the claim elements and a naked assertion that the corresponding elements were not found in the prior art.”)). Appellants present additional arguments at pages 4–5 of the Reply Brief but we do not view those arguments as being responsive to the Examiner’s explanation in the Examiner’s Answer, which refers to paragraphs cited in the Final Office Action (*compare* Final Act. 6–8 *with* Ans. 4–5). Therefore, we will not consider the arguments for claims 4, 7, 12, and 14 that were newly raised in the Reply Brief (37 C.F.R. § 41.41(b)(2)).

For the reasons discussed above and those set forth in the Examiner’s Answer, we sustain the Examiner’s § 102 rejection of claims 1–15 over Zhang.

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Application 15/195,817

DECISION

The Examiner's rejection of claims 1–15 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED