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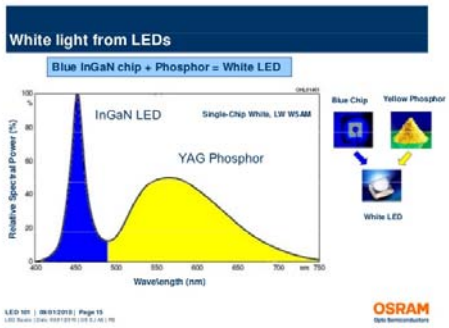
IN RE CREE

WHITE LEDS

- Many white LEDs are blue LEDs with phosphorous coated on them to produce white. It is the type of phosphors you use that allow you to tweak for color temperature.
- Mixtures of red, green and blue LEDs can product white light. It is not as efficient or precise. Part of the problem in the LED industry is consistency or lack thereof. Much of the cost is in parts binning and testing to filter LEDs that do no meet spec.

PHOSPHOR LEDS



EXAMPLE CLAIM

- Claim 118: A light-emission device, comprising a single die, two-lead gallium nitride based semiconductor blue light-emitting diode emitting radiation; and a recipient down-converting luminophoric medium for down-converting the radiation emitted by the light-emitting diode, to a polychromic white light, wherein the luminophoric medium is dispersed in a polymer that is on or about the single die, two lead gallium nitride based semiconductor.

PROCEDURAL POSTURE

- Patent in suit is Cree's U.S. Patent No. 6,600,175 filed in 1996 entitled "Solid State White Light Emitter and Display Using Same."
- *Ex parte* reexamination was filed by a third party requester on April 2, 2010.
- The Examiner rejected six claims added during reexamination of the '175 patent as obvious under multiple combinations of U.S. Patent No. 3,691,482 ("Pinnow"), U.S. Patent No. 3,819,974 ("Stevenson"), and U.S. Patent No. 5,578,839 ("Nakamura").
- Cree appealed to the P.T.A.B. the Examiner's final rejection of claims 118, 134-136, 138, and 140.

RE-EXAMINATION: EXAMINER'S POSITION

- The Examiner found that Stevenson discloses a light-emitting device comprising (1) a single die, two lead gallium nitride (GaN)-based semiconductor LED to emit primary radiation in the violet region of the spectrum, and (2) a down converting luminophoric medium including organic and inorganic phosphors to cover the primary radiation. But does not disclosure the use of blue LEDs and "down conversion" to produce white light.

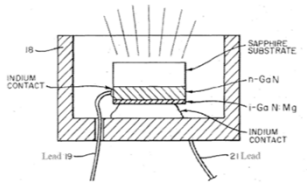


Fig. 3 of Stevenson discloses a single-die, two-lead GaN-based LED to emit primary radiation in the violet region of the spectrum.

RE-EXAMINATION: EXAMINER'S POSITION

- The Examiner relied on (1) Nakamura for disclosing high-power, high brightness blue LEDs, and (2) Pinnow for explicitly disclosing the "down-conversion" of the primary radiation using a mixture of phosphors to produce white light, the mixture of phosphorus being dispersed in a polymer that is "about" the primary radiation.
- The Examiner concluded that it would have been obvious to substitute Stevenson's GaN-based LED with the blue light emitting GaN-based LED disclosed in Nakamura because such is a simple substitution of one known element for another known element to obtain predictable results. Once the substitution is made, a person having ordinary skill in the art would have utilized the same "down-conversion" using a mixture of phosphors to cover the blue light output from the blue LED due to produce white light, as implicitly suggested by Stevenson and expressly disclosed by Pinnow.

RE-EXAMINATION: CREE'S POSITION

- None of the art suggests the use of a blue LED and "down-conversion" to create white light because i) Stevenson only discloses a violet LED, ii) Pinnow relies on a blue argon gas laser as a light source (something very different from a blue LED), and iii) Nakamura teaches a blue LED but provides no teaching or suggestion of down conversion.
- A POSA would not turn to Stevenson when considering the creation of white light from an LED because Stevenson's LED is a very low power, MIS type device unsuitable for creation of white light.
- A POSA would not turn to Pinnow if considering the creation of white light from an LED because Pinnow relies on an extremely high power laser.
- Stevenson and Pinnow, if combined, do not yield white light.

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RE-EXAMINATION: CREE'S EVIDENCE

- Cree provided several declarations under 37 C.F.R. 1.132 from several renown experts. The declarations explained i) the industry was using a direct emission triplet approach with individual LEDs that emit three primary colors to form white light ii) those of ordinary skill would have pursued the RGB "triplet" approach because down conversion would waste energy and iii) single white LEDs were not possible until after Cree's invention.
- Cree provided several additional declarations under 37 C.F.R. 1.132 of i) long felt but unsolved need, ii) unexpected results, iii) scientific recognition, iv) licensing, and v) commercial success. Cree also cited additional contemporaneous evidence:
  - Dr. Nakamura characterized the "down-conversion" approach as "impossible" in his book, THE BLUE LASER DIODE (2000);
  - Nichia's executive described Cree's invention as pioneering; and
  - Alfred Vollmer stated "The mixture of colors making up white light was up to now only possible by combining three different diodes."

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PTAB DECISION

- The Examiner has provided a comprehensive response.
- Appellant's arguments are predicated upon: (1) multiple attacks of Stevenson, Pinnow, and Nakamura individual, (2) mischaracterization of the Examiner's reliance, and (3) improper bodily incorporation of Pinnow into Stevenson.
  - Each reference must be read, not in isolation, but for what if fairly teaches in combination with the prior art as a whole. *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).
  - Non obviousness cannot be demonstrated by physically combining the references. *In re Sneed*, 710 F.2d 1544, 1550 (Fed. Cir. 1983).
  - All the features of the secondary reference need not be bodily incorporated into the primary reference. *Keller*, 642 F.2d at 425.

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PTAB DECISION

- The claimed invention is obvious, in light of the high-power, high-brightness blue LEDs developed by Dr. Shuji Nakamura in late 1993, a major breakthrough in light technology for which he was awarded the Nobel Prize in Physics. Appellants invention is nothing more than a new application of a high-power, high brightness blue LED developed by Dr. Nakamura. The application is predictable in view of:
  - The state of the art in LEDs;
  - The market demand for white light;
  - The finite number of identified predictable solutions available to covert light from LEDs into white light; and
  - The sensibility of choosing the down-conversion approach over the direct-emission "triplet" approach because of the ability to form white light without the need of multiple RGB LEDs positions on a single die.

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PTAB DECISION

- Expert testimonies acknowledge (1) Stevenson's seminal work on a violet/blue LED in early 1974, and (2) at the time of Appellant's invention in early 1996, there were two known approaches to produce white light from LEDs. One was triplet. One was down-conversion.
- Expert testimonies provide the main reason the "down-conversion" process was not used prior to 1994-1996 was because (1) such a down conversion process requires a significant amount of power, and LEDs available did not have enough power, and (2) phosphors were more expensive than other semiconductors.

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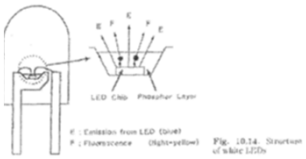
PTAB DECISION

- Dr. Nakamura's book describes the opposite of Cree's contention. Dr. Nakamura concludes that the triplet approach is more expensive because "RGB" LEDs are required instead of single-color LEDs. As a result Nakamura suggests fabricating white LEDs using blue LEDs in combination with "down conversion." The book also includes an example structure with a down-converting medium.



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PTAB DECISION

- Alfred Vollmer explains that scientists at Fraunhofer Institute developed white LEDs based on Dr. Nakamura's blue LEDs.
- Cree's characterization of Nichia's vice president is misleading. The article refers to a patent cross licensing agreement between Cree and Nichia designed to prevent litigation. The word pioneering was used in reference to a larger patent portfolio.

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PTAB DECISION

- Long felt need dismissed. There was a long felt need for a white LED device that was bright enough to be commercially viable. Not for the claimed invention.
- Unexpected results dismissed. No comparison relative to the closest prior art provided.
- Scientific recognition dismissed. Praise was directed to the invention of others.
- Licensing dismissed. Licensing alone is insufficient. A nexus must be provided. The provided exhibits are nothing more than press releases with minimal reference to the '175 patent. In the absence of specific terms, these are not probative evidence of non-obviousness.
- Commercial success dismissed. Provided market research data is not actual sales data. Additionally, the court is unable to exclude the possibility that success is due to other factors.

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FEDERAL CIRCUIT DECISION

- Cree argued that the board erred by assuming that it was known in the prior art to make white light from a monochromatic LED through down-conversion.
  - The Board's decision makes clear that the Board focused on the general process of down conversion rather than any disclosure of down conversion from a particular source, i.e. an LED.

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FEDERAL CIRCUIT DECISION

- Cree argued that the board reached its conclusion that down-conversion was known by misreading the declarations of Cree's experts.
  - Cree's experts testified that down conversion from a blue LED to white light was a known, but disfavored, option. The Board's decision that down conversion was a known solution is support by substantial evidence.

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FEDERAL CIRCUIT DECISION

- Cree contended that neither the Examiner nor the Board articulated any motivation why a skilled artisan would have combined the teachings.
  - The Board found that a person of ordinary skill in the art would realize that Nakamura would be an upgrade over the LED of Stevenson. The Nakamura LED would therefore be suitable to produce white light based on the teachings of Pinnow.
    - The large power of the laser is not relevant. A POSA would appreciate a phosphor does not care how an incident photon of light was generated.
    - The difficulty of color mixing and phosphor selection was not that difficult. The issue of phosphor selection for UV-to-blue radiation was successfully addressed in the 1930s.

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FEDERAL CIRCUIT DECISION

- Cree argued that the Board improperly rejected Cree's proffered secondary evidence of non-obviousness.
  - While "praise in the industry for a patented invention, and specifically praise from a competitor tends to "indicate that the invention was not obvious," self-serving statements from researchers about their own work do not have the same reliability. *Power-One v. Artesian Techs., Inc.*, 599 F.3d 1343, 1352 (Fed. Cir. 2010).
  - Cases "specifically require affirmative evidence of nexus where the evidence of commercial success presented is a license, because it is often cheaper to take licenses than to defend infringement suits." *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1324 (Fed. Cir. 2004). Additionally, the press releases indicate broad cross-licenses. It is reasonable that the licenses were found not to have sufficient nexus.
  - The commercial success declaration merely alleges that there is a nexus between the success of white LEDs and the claimed invention. When commercial success is cited as a basis for inferring non-obviousness, a nexus must be shown between the commercial success and the claimed features of the patent. *In re Huang*, 100 F.3d 135, 139-40 (Fed. Cir. 1996).

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PRACTICE TAKE-AWAYS

- Ex parte Reexaminations can be an effective method to invalidate a patent.
- Be careful of characterization of evidence relied upon.
- When preparing declarations be cautious of how the board/court may interpret opinions of experts.
- When relying on secondary factors ensure requirements of each factor is met, e.g. inclusion of comparative data, explanation of nexus.
- Pitfalls exist with respect to broad claims after "breakthrough" inventions.