EXHIBIT F

ERIC C. BRETSCHNEIDER

Direct Examination

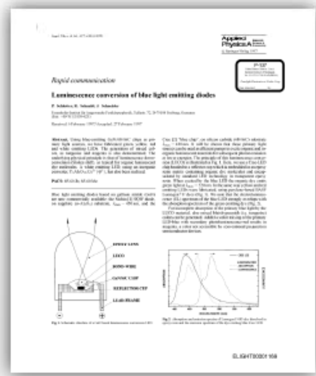
Schlotter

1. A light emitting device, comprising a light emitting component and a phosphor capable of absorbing a part of light emitted by the light emitting component and emitting light of wavelength different from that of the absorbed light;

wherein said light emitting component comprises a nitride compound semiconductor represented by the formula: $In_iGa_jAl_kN$ where $0 \leqq i$, $0 \leqq j$, $0 \leqq k$ and $i+j+k=1$

and said phosphor contains a garnet fluorescent material comprising 1) at least one element selected from the group consisting of Y, Lu, Se, La, Gd and Sm, and 2) at least one element selected from the group consisting of Al, Ga and In, and being activated with cerium.

2. A light emitting device according to claim 1, wherein the phosphor used contains an yttrium-aluminum-garnet fluorescent material containing Y and Al.



Abstract. Using blue-emitting GaN/6H-SiC chips as primary light sources, we have fabricated green, yellow, red and white emitting LEDs. The generation of mixed colors, as turquoise and magenta is also demonstrated. The underlying physical principle is that of luminescence down-conversion (Stokes shift), as typical for organic luminescent dye molecules. A white emitting LED, using an inorganic converter, $Y_3Al_5O_{12}:Ce^{3+}(4f^1)$, has also been realized.

P-137, Schlotter at p. 417

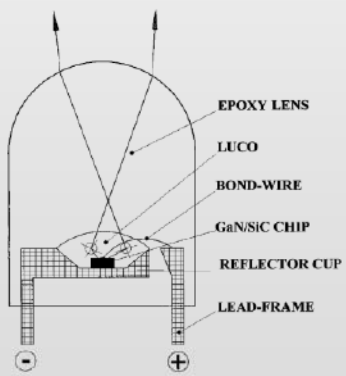


Fig. 1

Blue light emitting diodes based on gallium nitride (GaN) are now commercially available: the Nichia [1] SQW diode, on sapphire (α-Al_2O_3) substrate, $\lambda_{max} = 450$ nm, and the Cree [2] "blue chip", on silicon carbide (6H-SiC) substrate $\lambda_{max} = 430$ nm. It will be shown that these primary light sources can be used as efficient pumps to excite organic and inorganic luminescent materials for subsequent photon emission at lower energies. The principle of this luminescence conver-

P-137, Schlotter at p. 417

Nakamura SPIE

1. A light emitting device, comprising a light emitting component and a phosphor capable of absorbing a part of light emitted by the light emitting component and emitting light of wavelength different from that of the absorbed light;

wherein said light emitting component comprises a nitride compound semiconductor represented by the formula: $In_iGa_jAl_kN$ where $0 \leqq i$, $0 \leqq j$, $0 \leqq k$ and $i+j+k=1$

and said phosphor contains a garnet fluorescent material comprising 1) at least one element selected from the group consisting of Y, Lu, Se, La, Gd and Sm, and 2) at least one element selected from the group consisting of Al, Ga and In, and being activated with cerium.

2. A light emitting device according to claim 1, wherein the phosphor used contains an yttrium-aluminum-garnet fluorescent material containing Y and Al.

Figure 9 shows the excitation spectra of YAG phosphors with various compositions. The excitation spectra show three peaks. The main peak is in the blue region between the wavelengths of 430 nm- 460 nm. Emission of these wavelengths are easily obtained by changing the indium composition of the InGaN active layer of the blue SQW LED.[15] Thus excitation of YAG phosphors by blue SQW LEDs of specific wavelengths can easily be achieved.

P-138, Nakamura SPIE at 32

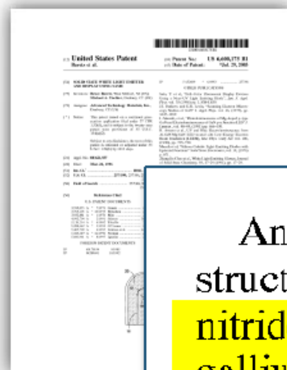
Baretz

1. A light emitting device, comprising a light emitting component and a phosphor capable of absorbing a part of light emitted by the light emitting component and emitting light of wavelength different from that of the absorbed light;

wherein said light emitting component comprises a nitride compound semiconductor represented by the formula: $In_iGa_jAl_kN$ where $0 \leq i$, $0 \leq j$, $0 \leq k$ and $i+j+k=1$

and said phosphor contains a garnet fluorescent material comprising 1) at least one element selected from the group consisting of Y, Lu, Se, La, Gd and Sm, and 2) at least one element selected from the group consisting of Al, Ga and In, and being activated with cerium.

2. A light emitting device according to claim 1, wherein the phosphor used contains an yttrium-aluminum-garnet fluorescent material containing Y and Al.



An ultraviolet LED light source suitable for use in the structure of FIG. 1 may comprise: aluminum gallium indium nitride; aluminum gallium nitride; indium gallium nitride; gallium nitride or any other ultraviolet emitting diode. A blue LED light source may be based on: indium gallium nitride; silicon carbide; zinc selenide; or any other blue light emitting diode source.

P-11, Baretz at 10:20-26

In one embodiment, LED **13** comprises a leaded, gallium nitride based LED which exhibits blue light emission with an emission maximum at approximately 450 nm with a FWHM of approximately 65 nm. Such a device is available commercially from Toyoda Gosei Co. Ltd. (Nishikasugai, Japan; see U.S. Pat. No. 5,369,289) or as Nichia Product No. NLPB520, NLPB300, etc. from Nichia Chemical Industries, Ltd. (Shin-Nihonkaikan Bldg. 3-7-18, Tokyo, 0108 Japan; see Japanese Patent Application 4-321,280). The down-

P-11, Baretz at 9:10-18

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