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Nitta et al.

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- (54) **METHOD OF MANUFACTURING BLUE LIGHT EMITTING ELEMENT**
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- (73) Assignee: **Kabushiki Kaisha Toshiba**, Kawasaki (JP)
- (*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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- (51) **Int. Cl.⁷** **H01L 21/20; H01L 21/205; H01L 33/00; H01S 3/18**
- (52) **U.S. Cl.** **438/46; 438/47; 438/505; 438/508; 438/509; 438/930**
- (58) **Field of Search** 257/96, 97, 103; 372/43, 45; 438/46, 47, 479, 503, 505, 507, 509, 508, 930

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(57) **ABSTRACT**

A gallium-nitride-based blue light emitting element that is manufacturable through a small number of processes and a method of manufacturing the same are disclosed. A first gallium-nitride-based semiconductor layer containing impurities of a first conductivity type, a gallium-nitridebased semiconductor active layer that is substantially intrinsic, and a second gallium-nitride-based semiconductor layer containing impurities of a second conductivity type that is opposite to the first conductivity type are formed according to a thermal CVD method and are left in an inert gas to cool by themselves.

23 Claims, 4 Drawing Sheets

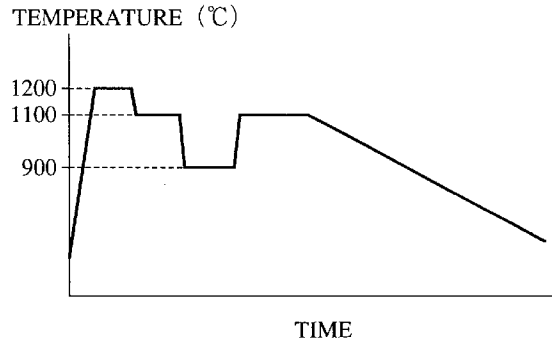
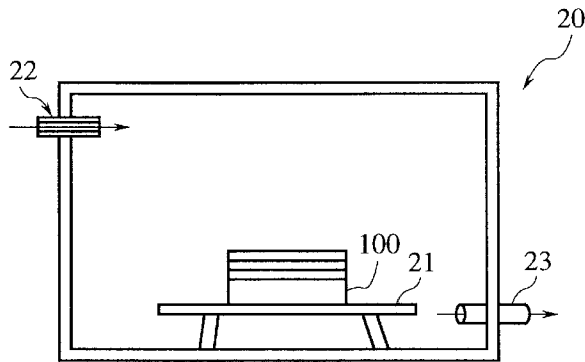


FIG. 1

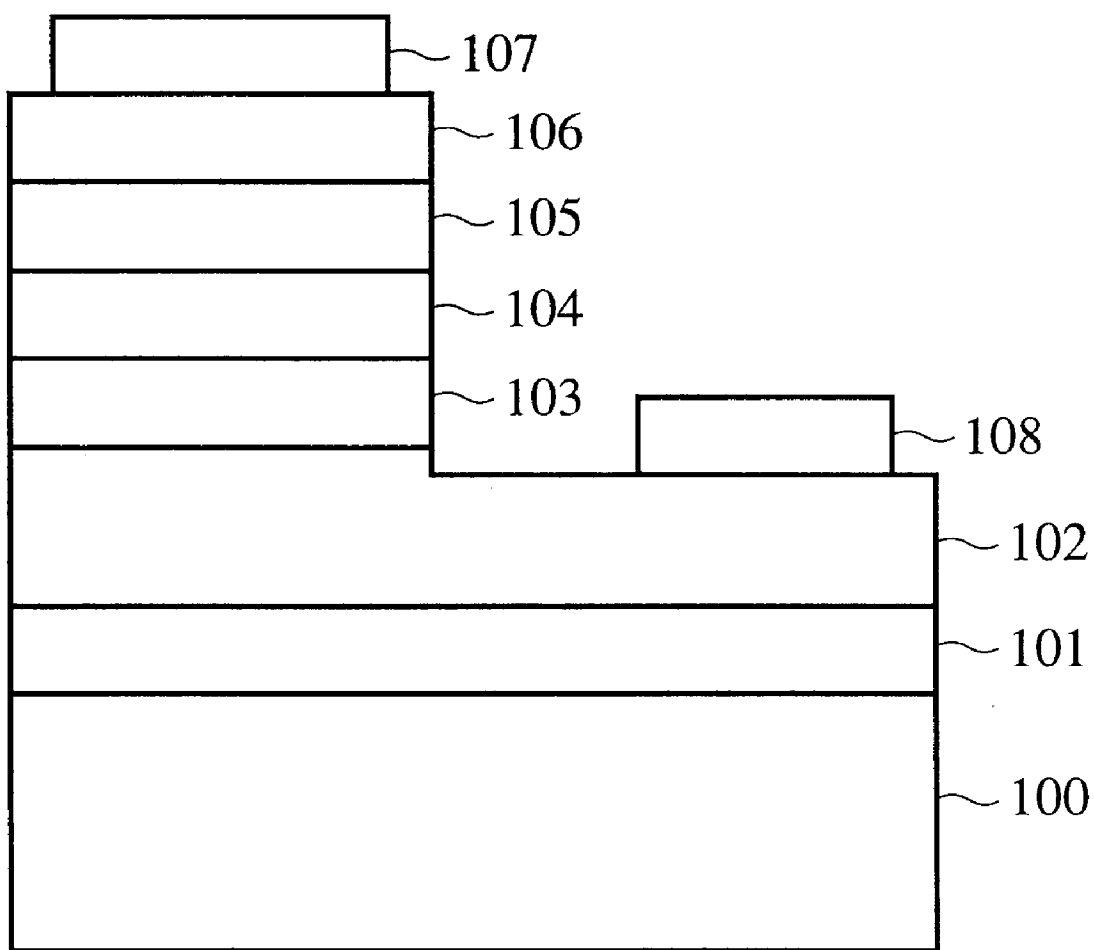


FIG.2

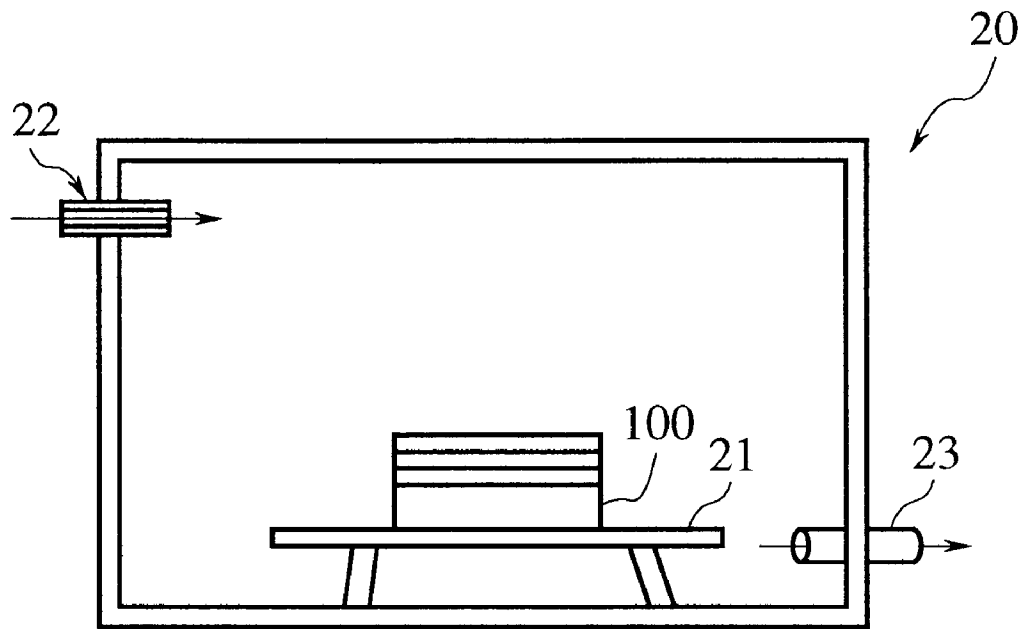


FIG.3

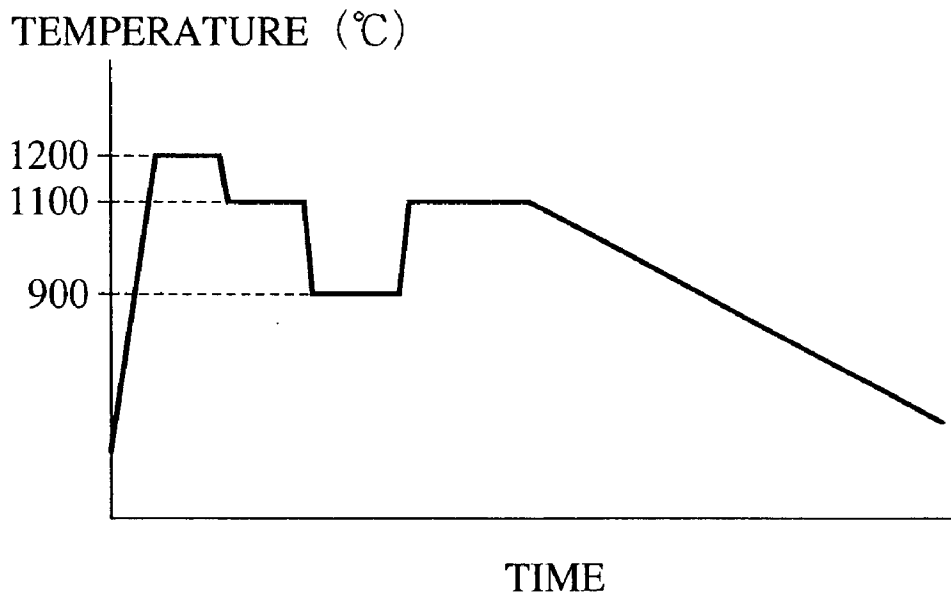


FIG.4

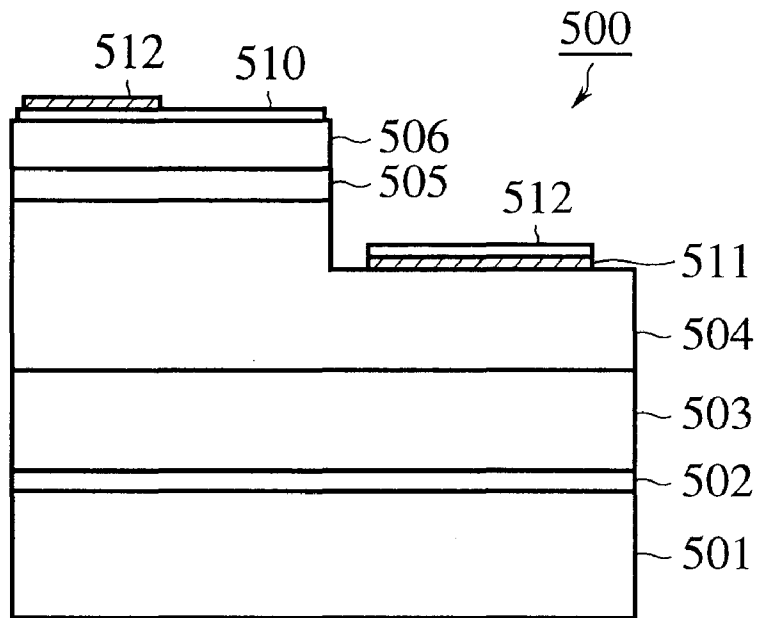


FIG.5

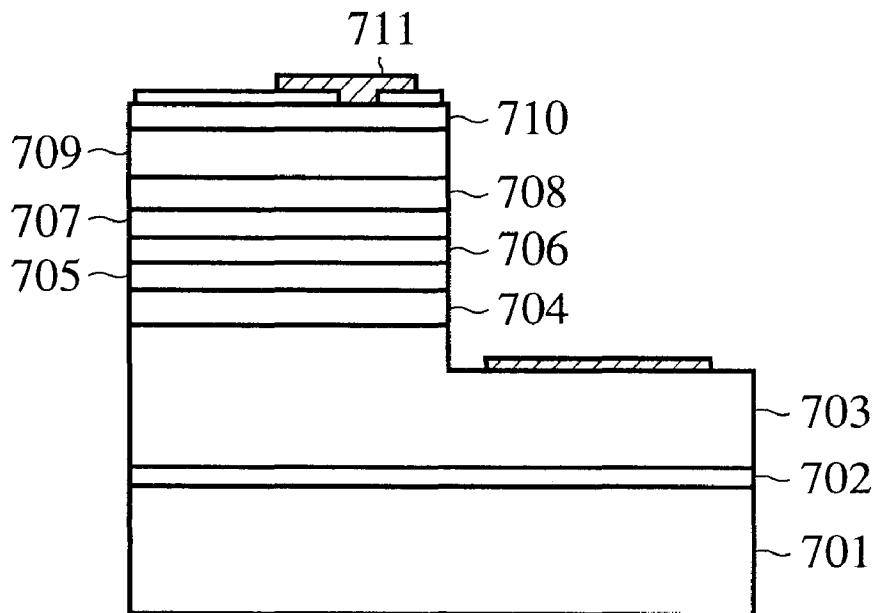


FIG.6

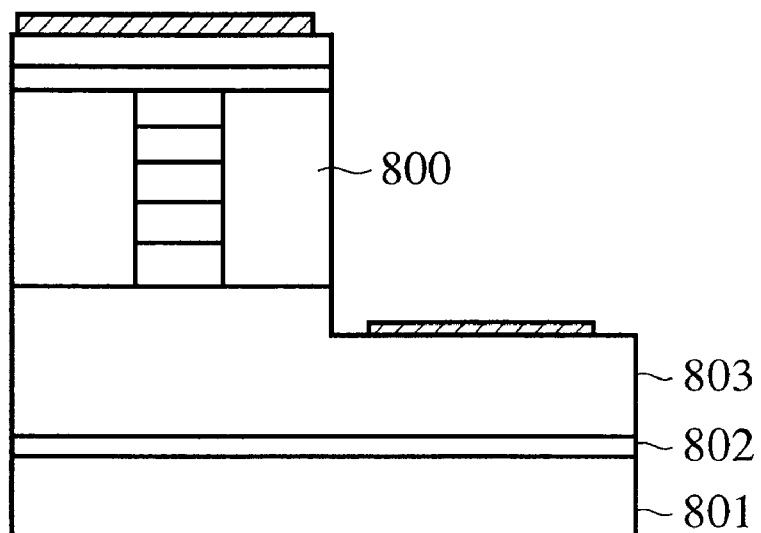
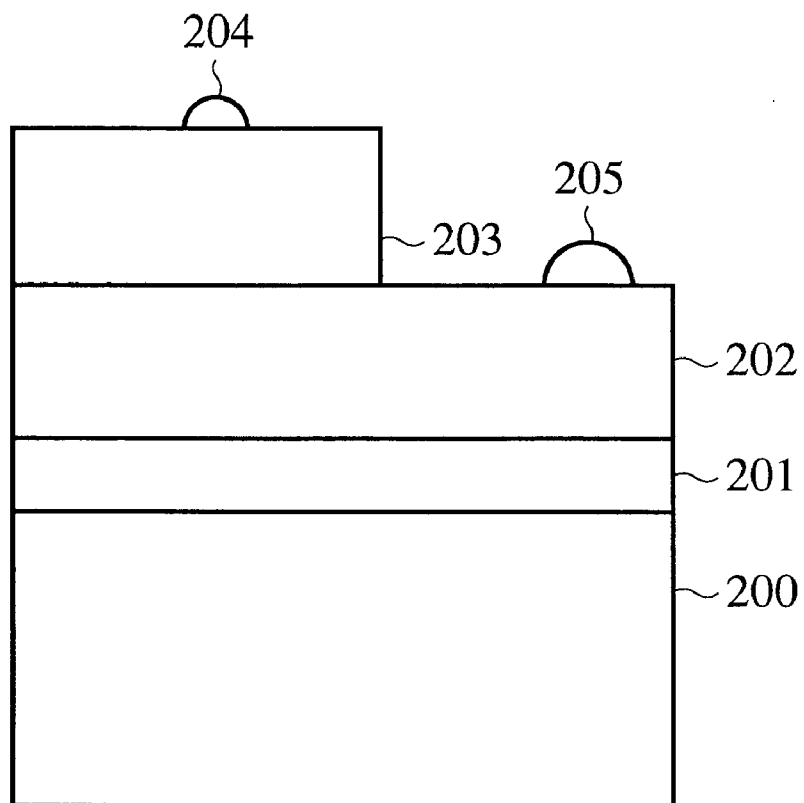


FIG.7



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