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Kidoguchi et al.

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(54) **METHOD OF FABRICATING NITRIDE SEMICONDUCTOR, METHOD OF FABRICATING NITRIDE SEMICONDUCTOR DEVICE, NITRIDE SEMICONDUCTOR LIGHT EMITTING DEVICE AND METHOD OF FABRICATING THE SAME**

(51) **Int. Cl.<sup>7</sup>** ..... H01L 21/00  
(52) **U.S. Cl.** ..... 438/46; 438/44; 438/47; 438/604; 257/103  
(58) **Field of Search** ..... 438/37-44, 46-48, 438/604, 606, 607, 687, 589, 51; 257/103

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*Primary Examiner*—Amir Zarabian  
*Assistant Examiner*—Khanh Duong

(74) *Attorney, Agent, or Firm*—McDermott Will & Emery LLP

(57) **ABSTRACT**

The method of fabricating a nitride semiconductor of this invention includes the steps of forming, on a substrate, a first nitride semiconductor layer of  $Al_uGa_vIn_wN$ , wherein  $0 \leq u, v, w \leq 1$  and  $u+v+w=1$ ; forming, in an upper portion of the first nitride semiconductor layer, plural convexes extending at intervals along a substrate surface direction; forming a mask film for covering bottoms of recesses formed between the convexes adjacent to each other; and growing, on the first nitride semiconductor layer, a second nitride semiconductor layer of  $Al_xGa_yIn_zN$ , wherein  $0 \leq x, y, z \leq 1$  and  $x+y+z=1$ , by using, as a seed crystal, C planes corresponding to top faces of the convexes exposed from the mask film.

**87 Claims, 43 Drawing Sheets**

(75) **Inventors:** Isao Kidoguchi, Hyogo (JP); Akihiko Ishibashi, Osaka (JP); Ryoko Miyanaga, Nara (JP); Gaku Sugahara, Nara (JP); Masakatsu Suzuki, Osaka (JP); Masahiro Kume, Shiga (JP); Yuzaburo Ban, Osaka (JP); Kiyoyuki Morita, Kyoto (JP); Ayumu Tsujimura, Osaka (JP); Yoshiaki Hasegawa, Osaka (JP)

(73) **Assignee:** Matsushita Electric Industrial Co., Ltd., Osaka (JP)

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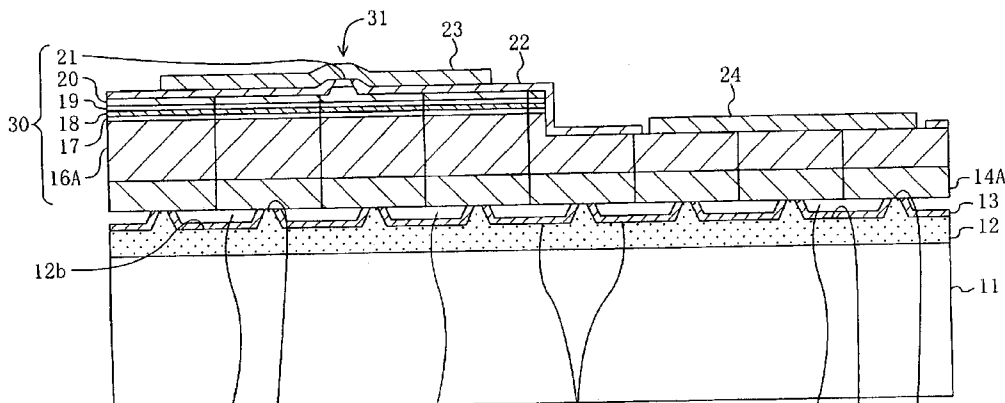
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FIG. 1

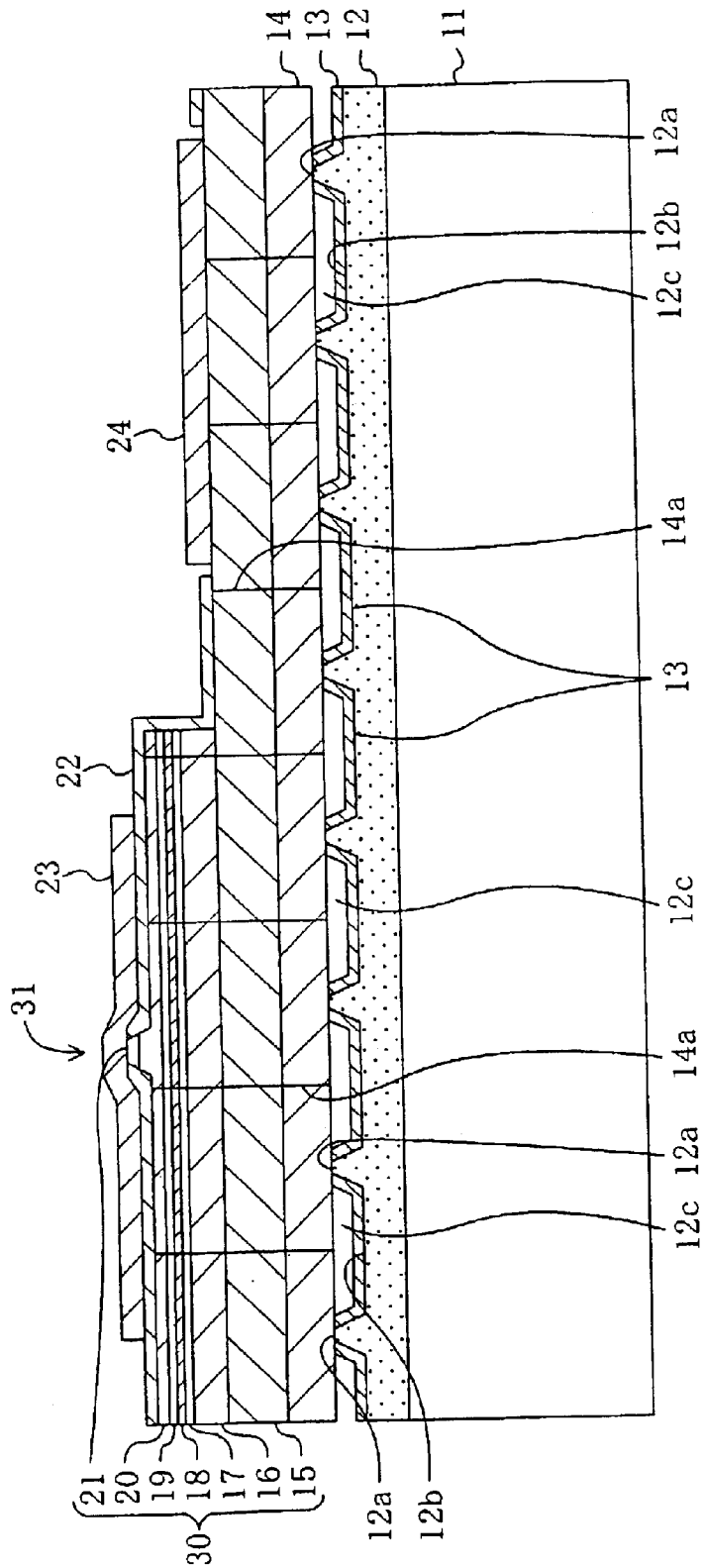


FIG. 2(a)

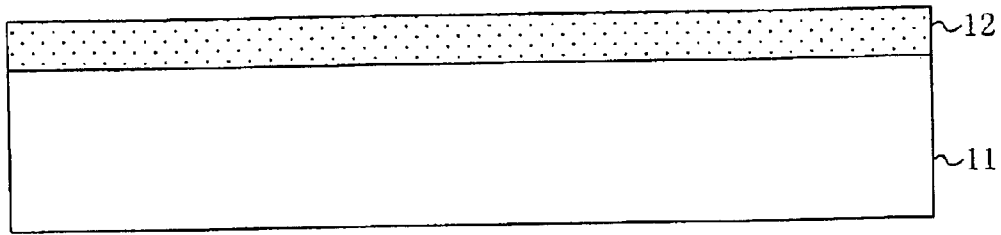


FIG. 2(b)

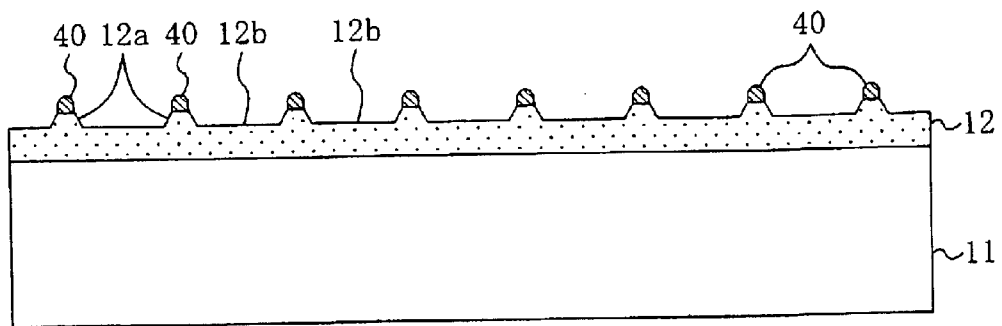


FIG. 3(a)

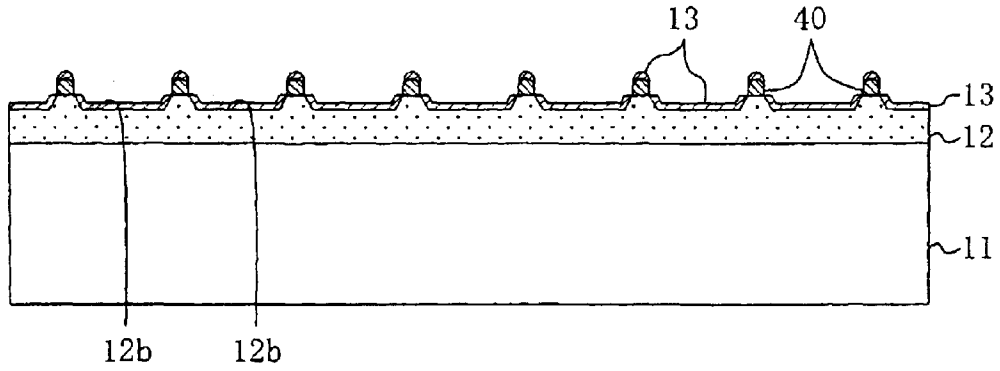
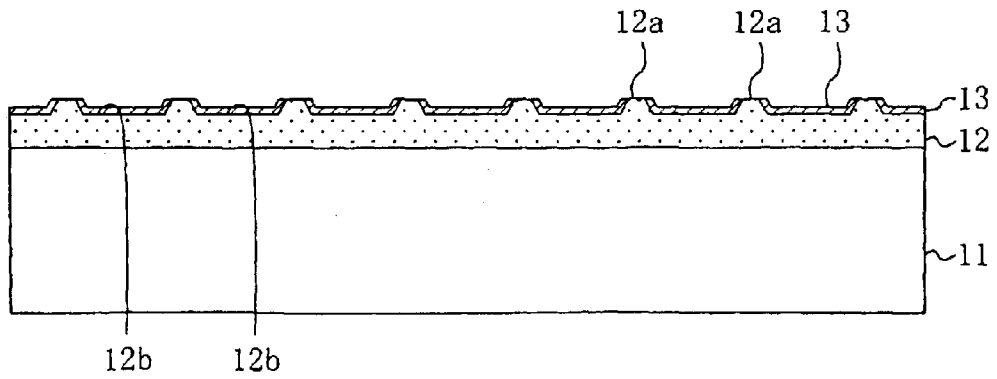


FIG. 3(b)



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