

Nitride semiconductor freestanding substrate production method

Able to product GaN at low cost by forming of nitride semiconductor crystal boules

Summary

Recently, III-nitride semiconductors (GaN and InGaN) have been attracting attention as semiconductor materials for light-emitting devices such as LED and lasers. This nitride semiconductor has a bandgap energy with wide range wavelengths from infrared to ultraviolet light, and it is a promising material for blue & green LED and semiconductor lasers with UV to infrared region emission wavelengths. However, in the case of nitride semiconductors, the equilibrium vapor pressure between the gas and solid phases of nitrogen is much higher than the conventional III-V materials, so it is not possible to fabricate GaN single crystal substrates at low cost. Another option is to use freestanding GaN substrates, but the current fabrication techniques are costly.

This invention is able to fabricate nitride semiconductor freestanding substrates with low threading dislocation density at a low cost. This invention comprises a total of seven steps, from the process of forming a buffer layer having a nitride semiconductor on the growing substrate main surface, to the process of fabricating a plurality of nitride semiconductor freestanding substrates.

Effect

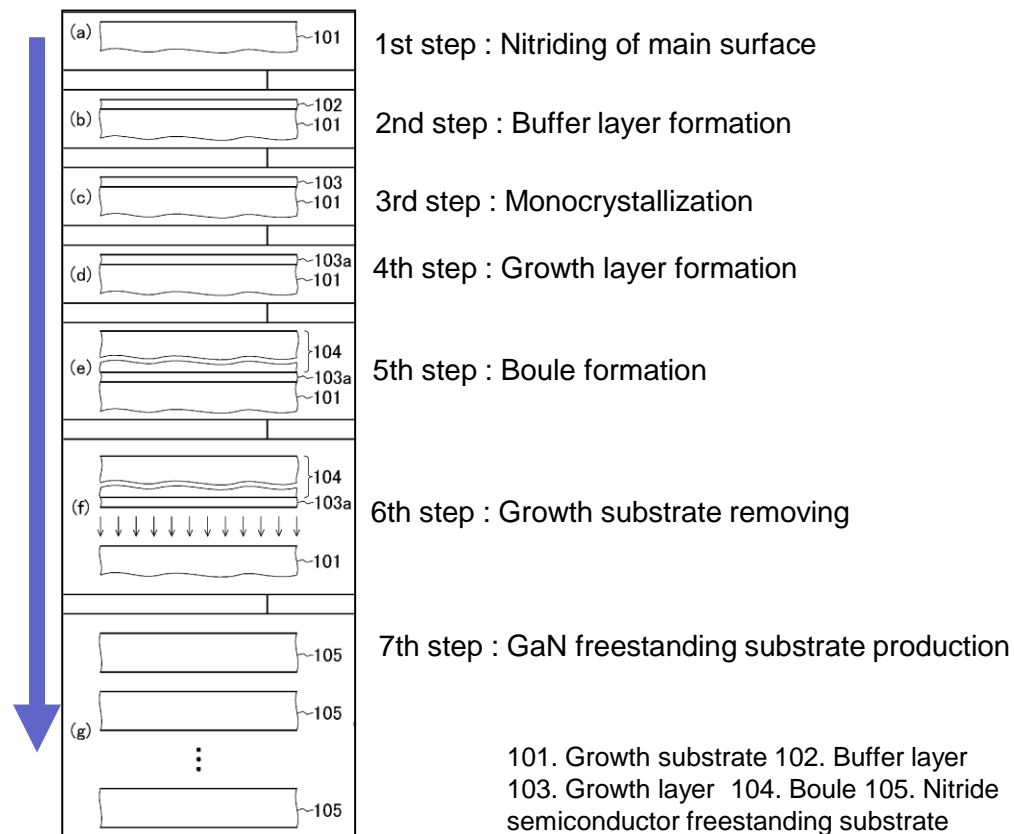
Fabrication of nitride semiconductor freestanding substrates at low cost by forming boules consisting of nitride semiconductor crystals

Application

- Light-emitting diodes, lasers, etc.

Patent Data Sheet

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Explanation of nitride semiconductor freestanding substrate production method

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