# Growth of Group III-Nitride Crystals using Supercritical Ammonia and Nitrogen

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## BRIEF DESCRIPTION

An ammonothermal growth method for high-quality group III-nitride bulk crystals at commercially practical growth rates.

## BACKGROUND

Ammonothermal growth has the potential for growing large bulk group III-nitride crystals, because supercritical ammonia used as a fluid medium has high solubility of source materials, such as group III-nitride polycrystals, and has high transport speed of dissolved precursors. However, the growth rate of high-quality group III-nitride single crystals becomes very slow when using the ammonothermal method. The tate-of-the-art ammonothermal method is limited by the growth rate of the group III-nitride crystal, which impedes the application of this method to industrial mass production.

## DESCRIPTION

Researchers at the University of California, Santa Barbara have developed an ammonothermal growth method for high-quality group III-nitride bulk crystals at commercially practical growth rates. This process involves increasing the nitrogen pressure in the reaction vessel to avoid disassociation of the ammonia and solves the issues related to state-of-the-art ammonothermal methods.

## ADVANTAGES

- Avoid ammonia dissociation
- Faster than previous ammonothermal growth
- Can be scaled up to industrial mass production

## APPLICATIONS

- Growth of group III-nitride crystals

This technology is available for a non-exclusive license. See below for a selection of the patents and patent applications related to this invention. Please inquire for full patent portfolio status.

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## INVENTORS

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## OTHER INFORMATION

### KEYWORDS

III-Nitride Crystals, indssl, indbulk, indammono, cenIEE

### CATEGORIZED AS

- **Engineering**
- **Energy**
  - Lighting
  - Other
- **Materials & Chemicals**
  - Other
- **Semiconductors**
  - Design and Fabrication

### RELATED CASES

2007-774-0

## PATENT STATUS

| Country | Type | Number | Dated | Case |
|---|---|---|---|---|
| United States Of America | Issued Patent | 7,803,344 | 09/28/2010 | 2007-774 |

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Improved GaN Substrates Prepared with Ammonothermal Growth
- Growth of Polyhedron-Shaped Gallium Nitride Bulk Crystals
- Method for Growing High-Quality Group III-Nitride Crystals

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