

GaN 단결정에 의해 제조된 Ga<sub>2</sub>O<sub>3</sub> 나노물질의 구조  
The structure of Ga<sub>2</sub>O<sub>3</sub> nanomaterials synthesized by the GaN single crystal

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The metallic oxide nanomaterials including ZnO, Ga<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, and SnO<sub>2</sub> have been synthesized by a number of methods including laser ablation, arc discharge, thermal annealing procedure, catalytic growth processes, and vapor transport. We have been interested in preparing the nanomaterials of Ga<sub>2</sub>O<sub>3</sub>, which is a wide band gap semiconductor ( $E_g=4.9$  eV) and used as insulating oxide layer for all gallium-based semiconductor. Ga<sub>2</sub>O<sub>3</sub> is stable at high temperature and a transparent oxide, which has potential application in optoelectronic devices. The Ga<sub>2</sub>O<sub>3</sub> nanoparticles and nanobelts were produced using GaN single crystals, which were grown by flux method inside SUS<sup>TM</sup> cell using a Na flux and exhibit plate-like morphologies with 4 ~ 5 mm in size. In these experiments, the conventional electric furnace was used. GaN single crystals were pulverized in form of powder for the growth of Ga<sub>2</sub>O<sub>3</sub> nanomaterials. The structure, morphology and composition of the products were studied mainly by X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), and high-resolution transmission electron microscopy (HRTEM).