

# Research on Compound Semiconductor Hetero / Nanostructures

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We manufacture nanostructures of compound semiconductors (quantum wells, quantum wires, quantum boxes, lasers and transistors using them, etc.) in nanometer size using molecular beam epitaxy (MBE) equipment. We study semiconductor nanotechnology by evaluating its structure, optical and electrical properties. The materials to be manufactured and evaluated are compound semiconductors mainly composed of GaAs, AlGaAs, etc. We are also introducing nitrogen plasma sources to fabricate nitride semiconductors such as GaN, GaInNAs, and GaNAs and search for new materials.

## 1. Fabrication and evaluation of GaAs / AlGaAs digital alloy

Evaluation of the effect of superlattice period on the epitaxial growth of digital alloy (GaAs / AlAs, superlattice) with the same average Al composition as AlGaAs mixed crystal semiconductor.

## 2. Fabrication of Ga (In) NAs strained semiconductor superlattice / strained quantum dots using nitrogen radical source

Epitaxial growth of Ga (In) NAs strained mixed crystal semiconductor evaluated.

## 3. Research on GaN / InGaN nanostructures.

Fabrication and characterization of GaN/InGaN nanostructures.

## 4. Fabrication of GaNAs-based semiconductor pin structure

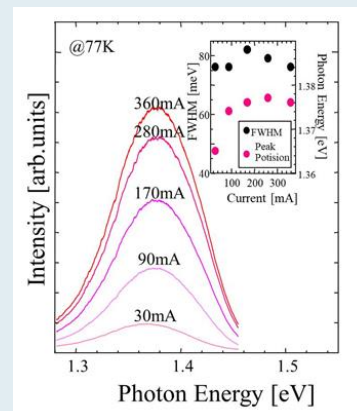
GaNAs semiconductor doped with Si or Mg for fabrication of a p-n structure device.

## 5. Fabrication of GaN, AlN multilayer film structure on Si substrate

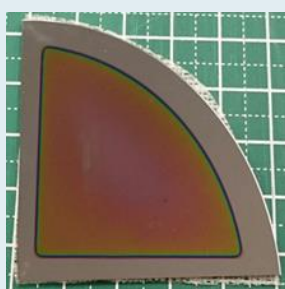
Fabrication and Study of a GaN / AlN multilayer hetero structure on a Si substrates.



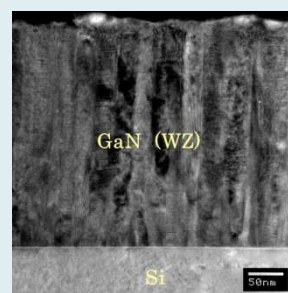
Molecular beam epitaxy (MBE)



Electro-luminescence from GaNAs wells



GaN on Si substrate



Cross section of GaN polycrystalline electron microscope on Si substrate