“Material Science” Research ---Growth---

Growth of Characterization of Nanosized High-Quality Semiconductor Structures

We investigate the effect of gas pulse sequence on N concentration, self-limiting mechanism (SLM), and crystal quality of the GaAs(N) grown by atomic layer epitaxy (ALE).

GaAs NWs were successfully grown on GaAs(001) substrates (Figs. (a), (b), and (e)). By introducing 1-2% of nitrogen, GaAs(N) nanostructures changed to nanodots (Figs. (c) and (d)).

Selective Area Growth of GaAs NWs on Si

Using patterned Si (001) substrates with (001) terraces and (111) facets, GaAs was evaporated on the substrates by molecular beam epitaxy technique without any catalysts.

NWs were formed only on (111) facets at the grooves, while thin films were formed on the terraces.

We have achieved a selective area growth of GaAs NWs on patterned Si (001) substrates.

Si Clathrate Crystal for New Solar Cell

Si polyhedral cages with Na encapsulated. Metallic properties by existence of Na.
Si Clathrate without Na becomes semiconductors.

Fabrication of Si & Ge Clathrate film
Characterization of Si & Ge Clathrate

Phosphor Preparation and Characterization

- Infrared phosphor: Optical amplifier for light communication.
- X-ray stimulated phosphor: X-ray detector for medical and security system.
- Elastic-luminescence material.

Study on Crystal Growth (Hetero-epitaxy)

- III-V Materials Grown on Silicon Substrate
- Long Wavelength Laser beyond 2 micron

Contact address in Japan (Miyazaki) : University of Miyazaki
Address : 1-1, Gakuen – Kibanadai – Nishi Miyazaki 889-2192
Web site : http://www.miyazaki-u.ac.jp/english/ Email: kokusai@cc.miyazaki-u.ac.jp