

## **Effects of Strain Relaxation on the Surface morphology of InGaAs/InAlAs layers grown on the lattice mismatched structures**

**Jaekyu Kim, Sookhyun Hwang, Hoonha Jeon, Chiyong Park, Joonhee Moon, Kyoungseok Noh, Sooyeon Lee, Jae-Young Leem, Minhyon Jeon<sup>†</sup>**

Department of Nano System Engineering, Institute of Nano Manufacturing, Inje University 621-749, South Korea

We have studied the interrelation between surface morphology and strain relaxation in InGaAs/InAlAs layers grown on  $\text{In}_x\text{Al}_{1-x}\text{As}$  buffer layers with a different indium gradient using molecular beam epitaxy (MBE). Surface morphology of strain relaxed samples is examined by atomic force microscopy (AFM). In AFM images, we have found the differences in surface morphology, roughness and pattern shapes among strain relaxed samples. It is found that cross-hatched patterns appear on the surface as the number of steps of  $\text{In}_x\text{Al}_{1-x}\text{As}$  graded buffer layers is smaller and total thickness of buffer layers is thinner. It has been known that the formation of a misfit dislocation network at the interface often causes cross-hatched pattern of the heterostructure surface in the lattice mismatched system. Therefore, in this presentation, we will investigate the relationship between surface morphology and strain relaxation.

**Keywords** : molecular beam epitaxy, atomic force microscope, strain relaxation, cross-hatched pattern, misfit dislocation

<sup>†</sup>Corresponding author: mjeon@inje.ac.kr