

## Texture and strain evolutions of ZnO nano-rods at initial growth stage

Hyun Hwi Lee and Dong-Ryeol Lee

Pohang Accelerator Laboratory, Pohang University of Science and Technology (POSTECH), Pohang, 790-784, Korea

Structural evolution of ZnO nano-rods (NR) at initial growth stage is investigated using x-ray reflectivity (XRR), x-ray diffraction (XRD) and grazing incidence wide angle x-ray diffraction (GI-WAXS) methods. ZnO NRs were grown by a chemical vapour deposition (CVD). Prior to NR growth, a low-temperature buffer layer was grown on c-plane sapphire substrate. ZnO NRs were grown vertically along c-axis and have in-plane epitaxial relationship, //  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>. However, a complicated texture was introduced at initial growth stages. The texture of NRs was investigated by an azimuthal angle dependent GI-WAXS.

For the detailed measurement of texture evolution on ZnO NRs, a new system of kappa-type 6 circle diffractometer directly combined with MAR345 image plate (IP) is installed at the wiggler beamline-5A (HFXS: High Flux X-ray Scattering) at Pohang Accelerator Laboratory (PAL) in Korea. Both scintillation detector and IP detector can be easily switched on the diffractometer, therefore, XRR, XRD and 2D-GID measurements are possible. 5A HFXS beamline is dedicated for materials science and provides monochromatic x-ray beams upto 22keV by a 28 multi-poled wiggler. These probing x-rays are focused using vertical focusing mirror and sagittal crystal of Si-monochromator, and finally collimated to 300(horizontal) x 300(vertical)  $\mu\text{m}^2$  in size.