

DETERMINATION OF CRYSTALLOGRAPHIC POLARITY OF THIN FILMS USING HIGH RESOLUTION XRD

Katsuhiko INABA
Rigaku Corporation, Tokyo Japan
inaba@rigaku.co.jp

It is well known that the crystallographic polarity for noncentrosymmetric crystals can be determined by analyzing the XRD profiles using the X-ray wavelength close the absorption edge of the constituent elements. [1] A new determination technique of the crystallographic polarity using conventional high resolution XRD (HR-XRD) system has been proposed recently.[2] By using Au X-ray source, polarity determinations for GaN-, GaAs- related materials, or ZnO related materials are possible. High resolution XRD analyses for these materials, such as X-ray Rocking Curve (XRC) measurements, Reciprocal Space Mappings (RSM), X-Ray Reflectivity (XRR) measurements, are also possible by employing the channel-cut monochromating crystals in the incident/receiving optical system.

Applying this technique to the epitaxial films, crystallographic polarity of non-polar GaN epitaxial films on *r*-sapphire substrates was clearly determined, and these results will be shown together with the result of crystallinity analysis of these films, as well as the polarity determination for GaAs and ZnO crystals.

1. for example, A.N. Mariano and R.E. Hanneman, *J. Appl. Phys.*, **34** (1963) 384
2. K. Inaba and H. Amano, *Physica Status Solidi*-(b), **244** (2007) 1775-1779