

Real-time X-ray Scattering as a Nanostructure Probe for Organic Photovoltaic Thin Films

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Recently, nanostructure and the molecular orientation of organic thin films have been largely paid attention due to its importance in organic electronics such as organic thin film transistors (OTFTs), organic light emitting diodes (OLEDs), and organic photovoltaics (OPVs). Among various methods, the diffraction and scattering techniques based on synchrotron x-rays have shown powerful results in organic thin film systems. In this work, we introduce the in-situ annealing system installed at PLS-II (Pohang Light Source II) for organic thin films by simultaneously conducting various x-ray scattering measurements of x-ray reflectivity, conventional x-ray scattering, grazing incidence wide angle x-ray scattering (GI-WAXS) and so on. Using the in-situ measurement, we could obtain real time variation of nanostructure as well as molecular orientation during thermal annealing in metal-phthalocyanine thin films. The variation of surface and interface also could be simultaneously investigated by the x-ray reflectivity measurement.

Keywords: In-situ, X-ray scattering, Nanostructure, OPV