

Organic LED Interfaces Studied with Resonant Soft X-Ray Reflectivity

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Multilayered polymer structures produced by alternate spin casting from polar and non-polar solvents were investigated using Resonant Soft X-ray Reflectivity (RSoXR). The polymers used are of particular interest for organic light emitting diodes (OLEDs). The structure of the interface between the active layers plays most likely a significant role in the device performance, yet little is known about the interfacial structure and how it affects properties of such devices. Recently, it has been shown that RSoXR is an excellent tool to study polymeric thin films without the need for deuteration. RSoXR can enhance the sensitivity to a particular interface by using specific photon energies around the carbon edge. We have used RSoXR to characterize the interfacial width of bilayers of MEH-PPV and PFNBr. MEH-PPV is a neutral conjugated polymer spun-cast from toluene (non-polar solvent) and PFNBr is a charged conjugated polymer (conjugated polyelectrolyte) spun-cast from methanol (polar solvent). Bilayers nominally 20 nm/80 nm PFNBr/MEH-PPV and 80 nm/ 20 nm MEH-PPV/PFNBr were investigated and their interfacial widths were determined to be 1.3 and 1.4 nm, respectively.