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Polymer LED interfaces studied with resonant soft x-ray reflectivity. CHENG WANG, B. WATTS, T. ARAKI, H. ADE, NCSU, A. HEXEMER, A. GARCIA, T.-Q. NGUYEN, G.C. BAZAN, K.E. SOHN, E.J. KRAMER, UCSB — Multilayered polymer structures produced by alternate spin casting from polar and non-polar solvents are promising for polymer light emitting diodes (PLEDs). The structure of the interface between the active layers most likely significantly affects the device efficiency, yet little is known about the interfacial structure and how it affects properties of such devices. Recently, it has been shown that Resonant Soft X-ray Reflectivity (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. We have used RSoXR and characterized the interfacial width of bilayers of poly[2-methoxy-5-(2'-ethylhexyloxy)-p-phenylene vinylene] (MEH-PPV) and poly[9,9-bis(6'-N,N,N,-trimethylammoniumhexyl)fluorene-co-alt-1,4 phenylene bromide] (PFNBr), materials relevant to PLED devices. 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.

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