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Multilayer polymer light emitting diode (PLED) devices studied using resonant soft x-ray reflectivity CHENG WANG, B. WATTS, T. ARAKI, H. ADE, NCSU, A. HEXEMER, LBNL, A. GARCIA, T.-Q. NGUYEN, G.C. BAZAN, K.E. SOHN, E.J. KRAMER, UCSB — The performance of multilayer PLED devices is likely to be strongly affected by the structure of the interface between the active layers. Using resonant soft x-ray reflectivity (RSoXR), the contrast between polymer components can be greatly enhanced by tuning the photon energy to absorption resonances near 285 eV and the interfacial width can be measured. The interfacial widths w of model bilayers of poly[9,9-bis(6'-N,N,N,-trimethylammoniumhexyl)fluorene-co-alt-1,4 phenylene bromide] (PFNBr)/poly[2-methoxy-5-(2'-ethylhexyloxy)-p-phenylene vinylene] (MEH-PPV) on SiO2 substrates were manipulated by changing the sample preparation process and were measured by RSoXR, allowing w to be correlated to device performance. In addition, for a real PLED device with a more complicated multilayer structure, but missing the top Al electrode, it was demonstrated that the top four interfaces can be fully characterized using RSoXR, adjusting the material contrast in order to selectively observe different layers by tuning to different photon energies.

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