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High Performance White Organic Light-Emitting Diodes SAMSON JENEKHE, MAKSUDUL ALAM, LLOYD RHOADS, Department of Chemical Engineering, University of Washington, Seattle, WA 98195 — White organic light-emitting diodes (OLEDs) are being considered as potential solid-state lighting sources. Some of the challenges toward that goal include low-cost fabrication of white OLEDs with high brightness and efficiencies using simple device architectures. White OLEDs were fabricated from multilayers or blends based on poly(9,9-dioctylfluorene) (PFO) and poly(2-methoxy-5(2'-ethyl-hexyloxy)-1,4-phenylenevinylene) (MEH-PPV). Insertion of a non-emissive polymer buffer layer between MEH-PPV and PFO allowed regulation of energy transfer between the two emissive polymers, affording efficient white OLEDs. Bright white light with a brightness of 1446 cd/m², an external quantum efficiency (EQE) of 0.94%, and a device efficiency of 1.1 cd/A was observed. The polymer blend OLEDs gave white light with CIE coordinates of (0.33, 0.34), a luminance of 4000 cd/m², an EQE of 3.1% and a luminous efficiency of 3.7 cd/A. The emission color and the performance of the blend devices were highly dependent on the composition and the morphology of the blends.

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