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Self-assembled OLEDs from rod-coil block copolymers Y. TAO, R.A. SEGALMAN, University of California Berkeley and Lawrence Berkeley National Lab — High efficient OLEDs tend to be made of many stacked layers including layers for hole transport, emission , and electron transport, which are produced via a very tedious sequence of high vacuum steps. Since conjugated rod-coil block copolymers form layer structures due to rod-coil repulsions and rod-rod interactions, they are an alternate route towards multi-layer devices which can be solution processed in one single step. A functional conjugated rod-coil block copolymer, poly(alkoxyphenylene vinylene-b-oxadiazole (PPV-b-OX), incorporates a hole transporting/emissive rod and an electron transporting coil. Grazing Incidence X-ray scattering is used to demonstrate the layered structure of the resulting self-assembled block copolymer film relative to the substrate (electrode). A multi-layer thin film self-assembled from PPV-b-OX shows significant improvement in luminescence and efficiency over pure PPV and PPV/OX blend devices. The correlation between details of thin film structure including lamellar spacing, orientation, and number of layers and device performance will also be discussed.

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