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Morphology of Hole Injection Layers for Polymer Light Emitting Diodes KRISTIN SCHMIDT, KAREN E. SOHN, Materials Research Laboratory, University of California, Santa Barbara, FABRICE AMY, LING YANG, Air Products and Chemicals Inc, Pennsylvania, EDWARD J. KRAMER, Materials Research Laboratory, University of California, Santa Barbara — Hole injection layers (HIL) play important roles in improving the device efficiency and stability of polymer light emitting diodes (PLED) as they can enhance the hole injection from the ITO electrode. It was shown that thermal annealing of the PLEDs results in a remarkable improvement in the long-term stability of the device. These reports lead to the hypothesis that changes in the morphology of the phase separated mixture of the polymers in the HIL is responsible for this improvement. However, no experimental evidence of such morphological changes exists. To investigate the morphological changes during annealing we performed NEXAFS, SAXS and GISAXS experiments on thin films of different blends consisting of poly(3,4-ethylene dioxythiophene) (PEDOT) with either poly(fluoroethylene-r-fluoroether-sulfonic acid) (PFFSA) or polystyrene sulfonic acid (PSSA) before and after the annealing procedure. The results indicate that a surface reconstruction takes place during annealing so that Nafion or PSSA cover the polymer film to lower the surface energy. In addition, we found a poorly ordered structure with a mean spacing of 5 nm as spun cast which coarsens during the annealing procedure.

Kristin Schmidt
Materials Research Laboratory, University of California, Santa Barbara

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