

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Morphological Studies of Bulk Heterojunction Organic Solar Cells KRISTIN SCHMIDT, JAMES ROGERS, Material Research Lab, UC Santa Barbara, JEFF PEET, ROBERT COFFIN, Chemistry Department, UC Santa Barbara, MICHAEL DIMITRIOU, EDWARD KRAMER, Material Research Lab, UC Santa Barbara, GUILLERMO BAZAN, Chemistry Department, UC Santa Barbara — A new approach offers the potential of introducing structural control during device fabrication without the need of thermal annealing. It was shown that incorporating of small concentrations of solvent additives in the solutions of conjugated polymer and fullerene derivatives from which the bulk hetero junction (BHJ) films are cast leads to a modification of the blend morphology. Despite the excellent power conversion efficiency of these films, important questions regarding the BHJ domain morphology remain unanswered. To probe the internal structures we performed complementary grazing incidence small and wide angle scattering experiments (GISAXS and GIWAXS). In addition, we conducted NEXAFS experiments to determine the blend composition at the interfaces. The results indicate a pronounced effect of polymer chain architecture on the degree of chain ordering within the films. The ordering can be further improved by incorporation of solvent additives during the casting process. The morphological changes in the BHJ systems are well correlated with the device characteristics.

Kristin Schmidt
Material Research Lab, UC Santa Barbara

Date submitted: 20 Nov 2009

Electronic form version 1.4