Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Controlling Photovoltaic Loss: Recombination of Dissociated Electrons and Holes in Organic Solar Cells ZHIHUA XU, HUIDONG ZANG, BIN HU — This presentation reports the studies of charge-transfer complex states formed from the recombination of dissociated electrons and holes at the donor-acceptor interfaces in bulk-heterojunction organic solar cells based on magnetic field effects of photocurrent. Our studies indicate that the formation of charge-transfer complex states is determined by the competition between Coulombic attraction and electrical drifting. Externally, applying electric field can clearly decrease the density of charge-transfer complex states through electrical drifting. Internally, morphology can change the competition between Coulombic attraction and electric drifting through dielectric fields and charge mobilities, and consequently affects the formation of charge-transfer complex states. As a result, changing internal dielectric fields and charge mobilities through internal Coulomb interaction and electrical drifting presents as two mechanisms to control the formation of charge-transfer complex states towards the improvement of photovoltaic efficiencies in organic bulk-heterojunction solar cells.

Bin Hu
University of Tennessee

Date submitted: 30 Nov 2008 Electronic form version 1.4