Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Tunable Charge Transfer Dynamics at Tetracene/LiF/C60 Interfaces[1] DMITRY YAROTSKI, Los Alamos National Laboratory, SIDDHARTH SAMPAT, University of Texas, ADITYA MOHITE, BRIAN CRONE, Los Alamos National Laboratory, ANTON MALKO, University of Texas, ANTOINETTE TAYLOR, SERGEI TRETIAK, Los Alamos National Laboratory — Organic conducting polymers offer an attractive alternative to regular semiconductors in both photovoltaic and optoelectronic applications due to their low cost and improved processability. Although current organic devices suffer from relatively low electro-optical conversion efficiency, novel polymer nanocomposites, both organic/organic and organic/inorganic, should provide better control over the material properties and improve the device performance. In such nanocomposites, physical and electronic structures of the interfaces govern carrier generation and transport characteristics yet underpinning mechanisms are still poorly understood. Here, we apply ultrafast optical spectroscopy to observe an interfacial charge transfer dynamics in Tc/LiF/C60 multilayered heterostructures, where charge separation processes compete with parasitic radiative and non-radiative charge transfer exciton recombination. Our studies reveal that the tunneling barrier created by LiF buffer layer between donor and acceptor materials provides means for independent control over the rates of direct and diffusion-induced charge transfer exciton formation and recombination dynamics. These findings might have implications for development of more efficient organic photovoltaic and light-emitting devices.

[1]This work was funded by the Los Alamos National Laboratory Directed Research and Development program.

Dmitry Yarotski
Los Alamos National Laboratory

Date submitted: 15 Nov 2013 Electronic form version 1.4