Physikalisches Institut
Fakultät für Mathematik und Physik
Albert-Ludwigs-Universität Freiburg

QE

Quantum Efficiency Seminar und Colloquium

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The Effect of Molecular Interfaces on Photophysical Processes in Blended Films for Organic Photovoltaic

The photoactive layers in organic photovoltaic (OPV) devices comprise of solid-state combinations of electron-donor (D) and electron-acceptor (A) molecules with relative molecular orbital energies suitable for exciton creation, subsequent exciton dissociation at the D-A interface, followed by diffusion-controlled charge collection at the OPV electrodes.[1] Recent work has highlighted the importance of electronic and molecular interactions at the D-A interface in driving these processes.[2] Optimal structure of the molecular interface can enhance desirable behavior such as charge separation, and suppress loss mechanisms such as geminate pair recombination. We consider this problem in a study of blended films of 6,13-bis-(triisopropylsilylethynyl) pentacene (TIPS-Pn) with N,N-bis (2,6-diisopropylphenyl) perylene-3,4:9,10-bis- (dicarboximide) (PDI) derivatives.[3] Ultrafast transient absorption spectroscopy demonstrates competitive photophysical processes in these films, which are further correlated with the trend in molecular interactions suggested by film morphology characterization.

1] Forrest, S.R. *MRS Bull.* **2005**, 30, 28−32.; Tang, C. W. *Appl. Phys. Lett.* **1986**, 48, 183−185.

[2] Linares, M., Beljonne, D., Cornil, J., Lancaster, K., Bredas, J.-L., Verlaak, S., Mityashin, A., Heremans, P., Fuchs, A., Lennartz, C., Ide, J., Mereau, R., Aurel, P., Ducasse, L., Castet, F. J. *J. Phys. Chem. C* **2010**, 114, 3215−3224.; Zhu, X. Y.; Kahn, A. *MRS Bull*. **2010**, 35, 443−448.

[3] Ramanan, C., Smeigh, A.L., Anthony, J.E., Marks, T.J., Wasielewski, M.R. *J. Am. Chem. Soc*. **2012**, 124, 386-397.

Date: **Tuesday, November 6th, 2012 2:15 pm**
Location: **Lecture Hall 1, Hermann-Herder-Str. 3, Freiburg**

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