Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Kolloquium der Physikalischen und Theoretischen Chemie

Dienstag, 17.10.2017 **Hörsaal D, Chemiezentralgebäude, 17:15 Uhr**

Sprecher: Vidmantas Gulbinas

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Titel: Charge carrier transport dynamics in disordered organic materials and solar cells

Abstract:

Charge carrier mobility is one of the most important parameters of electronic materials. Carrier mobility in disordered organic materials is low, strongly dependent on temperature, electric field strength and time. Charge carriers in such materials are localized and move by stochastic hopping between localized states. Gausian disorder model is typically used to describe carrier motion properties.

We used several optical and optoelectrical investigation techniques to address the carrier motion dynamics in disordered organic materials and bulk heterojunction (BHJ) organic solar cells. Optical probing of the electric field dynamics by means of Stark effect and electric field-induced second harmonic generation was used to examine motion of charge carriers with subpicosecond time resolution, while conventional transient photocurrent and time-delayed collection field techniques were used to address subsequent carrier motion, extraction and recombination. Comparing carrier motion dynamics in samples with different material morphology and stoichiometric ratios we were able to distinguish between electron and hole motions and to relate them to the dissociation efficiency. In addition to the commonly accepted conception of carrier motion via energetically disordered states, carrier tunneling and spatial traps were found to play an important role in carrier motion in BHJ active layers and other nanostructured materials.

Organisation: T. Hertel

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