Abstract of Presentation

Note: This paper should be typed in "Times New Roman" of 12pt.

Presentation Title(Should be no more than 20 words):

Triplet state energy transfer in organometallic and organic semiconductors

Abstract :

Organic semiconductors combine the electronic properties of a semiconductor with the mechanical advantages of plastics, and thus have become a rapidly advancing field. E-Readers made on the basis of organic field-effect transistors, plastic solar cells, flexible or flat displays or lighting products on the basis of organic light-emitting diodes (OLEDs) are currently pioneered by a number of companies. In order to advance the fascinating technologies that can be developped from this novel type of semiconductors, it is essential to develop a sound and detailed understanding of the underlying photophysical processes.

The operation of organic LEDs can be improved significantly when spin-triplet excited states are used towards light emission. To enhance the device performance, it is in particular necessary to recognize what governs the motion of triplet excitons through the organic semiconductor. Here we demonstrate that the diffusion of a spin-triplet exciton, so-called Dexter-type transfer, can be described as a simultaneous transfer of two charges. At low temperatures, this diffusion process occurs via quantum mechanical tunneling mechanism up to a transition temperature T_T. Above the transition temperature, the nature of the transfer changes to phonon assisted hopping that is thermally activated and can be described within the framework of Marcus theory. We discuss how electron-phonon coupling and energetic disorder affect the triplet transfer mechansim and comment on the implications for device and materials design.