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main goals:

- **dye- sensitized solar cells based on electrodeposited ZnO**
- **vapour- deposited organic bulk heterojunctions**

The group is actively working in the field of applied physics and physical chemistry of organic semiconductor thin films and hybrid materials. The group utilizes a broad experience in both, materials properties and methods of investigation of organic film growth from the vapour phase, their electronic structure and coupling of molecules to adjacent electronic systems.

Electrodeposited ZnO represents an almost ideal electrode material since it can be prepared from aqueous solutions without annealing in a crystalline continuous yet porous network. Sensitization by a variety of dyes was achieved and photovoltaic cells were optimized to an extent that technical application appears feasible [1-4]. Aside from film preparation and routine photovoltaic measurements, a focus of activities lies in the utilization of time- resolved and frequency- resolved photocurrent measurements to analyze the average lifetime of the photogenerated charge carriers in the cells and the average transit time to the back electrode to then discuss the harvesting rate as opposed to losses by recombination.

Evaporated bulk heterojunctions are attractive hybrids of organic bulk heterojunctions and multilayer vapour deposited cells. Photovoltaic studies in the group were extensively performed at organic semiconductor thin films (phthalocyanines and perylene imides) in contact to redox electrolytes to analyze in detail their semiconducting characteristics and interface reactions [5]. Thin films of phthalocyanines were studied in great detail and the influence of molecular substitutions on electrical and optical characteristics as well as film growth was clearly established [6-11]. Electrochemical redox data and photoelectron spectroscopy at isolated molecules and thin films are used to discuss the relative position of molecular energy levels and contact formation [12,13]. Growth studies of mixed monolayers of non- planar molecules with C_{60} represent a good starting point to discuss evaporated bulk heterojunctions since they showed a high tendency of interpenetrating phase formation [14,8,9].

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