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ZnO Transistor Interfaces Sensitized with Photo Donor Molecules[1] JOSEF SPALENKA, LUSHUAI ZHANG, PADMA GOPALAN, PAUL EVANS, University of Wisconsin-Madison — A better understanding of the physics at interfaces between semiconducting oxides and monolayers of covalently bonded organic molecules is relevant to important applications such as inexpensive chemical sensors and improved dye-sensitized solar cells. We use field-effect transistor (FET) structures in which electrical measurements are made before and after functionalizing the surface of ZnO nanocrystalline films, which form the channel of the FET, with organic dye molecules based on rhenium-bipyridine complexes that act as electron donors during illumination with monochromatic light. Measurements of the charge transfer as a function of light intensity and dye coverage give the ratio between the rates of charge transfer and recombination between the dyes and the ZnO, an important parameter to maximize to further improve the efficiency of solar cells based on donor functionalized oxides.

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