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Ultrafast Time-Resolved Spectroscopy of Photoinduced Electron Transfer in Novel Photovoltaic Devices[1] L.M. MIER, Department of Chemistry, The Ohio State University, Columbus, OH 43210-1185, A.R. CARTER, Department of Physics, The Ohio State University, Columbus, OH 43210, T.L. GUSTAFSON, Department of Chemistry, The Ohio State University, Columbus, OH 43210-1185, A.J. EPSTEIN, Departments of Physics and Chemistry, The Ohio State University, Columbus, OH 43210 — We present work toward an understanding of the fundamental photophysics of photoinduced electon transfer between 9-anthracenecarboxylic acid (9-AC) and TiO_2 nanoparticles in order to apply the techniques to a novel photovoltaic device. The active layers of a proposed device consist of a broad-spectrum, metallo-organic absorber[2] covalently bound through a carboxylic acid to a nano-porous TiO_2 structure. To study the electron transfer, a model compound, 9-AC, is covalently bound to TiO_2 nanoparticles. Ultrafast electron transfer from the excited 9-AC to the TiO_2 is observed within 50 fs using ultrafast broadband spectroscopy. Further evidence of this transfer is shown from quenching of the fluorescence of the 9-AC with increasing concentrations of TiO_2 with no effects on the lifetime of the fluorescence.

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[2]M.H.Chisholm, et al., Inorg.Chem.**47**, 3415 (2008).

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