

Abstract Submitted
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Photo-Induced Single Molecule Electron Transfer at the Molecule-Nanoparticle Interface¹ TIANQUAN LIAN, WANHEE GOH, JIAN-CHANG GUO, XI LIU, Dept. of Chemistry, Emory Univ., MICHAEL AHRENS, EMILIE SCHIERLOH, MICHAEL WASIELEWSKI, Dept. of Chemistry, Northwestern Univ. — Single molecule fluorescence spectroscopy was used to study photoinduced electron transfer (ET) dynamics across single donor-bridge-acceptor junctions consisting of perylene-3,4:9,10-bis(dicarboximide) (PDI), n-phenylene bridge with COOH anchoring group, and antimony doped Tin Oxide(ATO) nanoparticles. Photo-excitation of PDI initiates electron transfer from its excited state into ATO nanoparticles. Electron transfer was confirmed and ensemble average rate was measured by transient infrared absorption spectroscopy, in which injected electrons in ATO were directly monitored. Single molecule fluorescence from donor molecule was confirmed by the observed blinking behavior, fluorescence spectrum, and excitation polarization dependence. Single molecule fluorescence lifetime was measured by time-correlated single photon counting, from which forward electron transfer rate from adsorbate excited state to nanoparticle was determined. The dependence of these single molecule ET rates and their fluctuation on the length of phenylene bridge and the nature of semiconductors are being investigated.

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