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Influence of metal-organic interfaces on charge carrier dynamics ANDREW PLATT, WHITNEY SHEPHERD, THOMAS HATHAWAY, GARRETT BANTON, Oregon State University, JOHN ANTHONY, University of Kentucky, OKSANA OSTROVERKHOVA, Oregon State University — The interfaces of organic materials with metals play an important role in the function of various organic devices such as organic light-emitting diodes, thin-film transistors, and solar cells. In particular, it is important to understand what effect the interface has on charge injection and on the photoexcited charge carrier dynamics. We examine the influence of metal-organic interfaces between functionalized anthradithiophene (ADT) derivatives and Au or Al on charge carrier dynamics at various time-scales after excitation. While transient photocurrents observed on picosecond time-scales were similar in devices with Au and Al electrodes, continuous wave photoresponse, as well as dark currents, were significantly higher in Au devices. We also employ single molecule fluorescence spectroscopy to study charge transfer dynamics at the nanoscale. In particular, carrier transfer to the electrode (Au or Al) changes a “blinking” behavior of the ADT single molecules. By analyzing the “on” and “off” time statistics, forward and back electron transfer rates between Au or Al and single molecules of ADT are estimated.

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