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Femtosecond time-resolved x-ray photoelectron spectroscopy studies of charge transfer dynamics in novel photovoltaic systems OLIVER GESSNER, ANDREY SHAVORSKIY, KATRIN SIEFERMANN, DANIEL SLAUGHTER, FELIX STURM, FABIAN WEISE, MATTHEW STRADER, HANA CHO, MING-FU LIN, TRAVIS WRIGHT, JINGHUA GUO, HENDRIK BLUHM, ROBERT SCHOENLEIN, ALI BELKACEM, DANIEL NEUMARK, STEPHEN LEONE, Lawrence Berkeley National Laboratory, AMY CORDONES, JOSH VURA-WEIS, University of California Berkeley, SHERAZ GUL, JIN ZHANG, University of California Santa Cruz, DENNIS NORDLUND, HIROHITO OGASAWARA, ANDERS NILSSON, SLAC National Accelerator Laboratory, MARTIN BEYE, Helmholtz Zentrum Berlin, NILS HUSE, Max Planck Research Department for Structural Dynamics at the University of Hamburg, CFEL — Interfacial charge transfer dynamics in dye-sensitized semiconductor films are studied by femtosecond time-resolved x-ray photoelectron spectroscopy. The experiments performed at the Linac Coherent Light Source demonstrate the potential of time-domain inner-shell photoionization studies to monitor charge migration in complex interfacial systems with femtosecond time resolution, chemical sensitivity and atomic specificity. Using this new technique, the transient oxidation state of N3 dye molecules adsorbed to nanocrystalline ZnO is monitored with unprecedented site selectivity, providing an upper bound for the interfacial electron-hole recombination rate.

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