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Octadecanethiol Island Formation on Single Crystal Zinc Oxide Surfaces ANDREA YOCOM, REUBEN COLLINS, THOMAS FURTAK, DARICK BAKER, TIMOTHY OHNO, Colorado School of Mines — Organic photovoltaic devices, containing ZnO nanorod electron acceptor arrays intercalated with organic polymers, could lead to low-cost solar cells. Surface modifications of ZnO with octadecanethiol (ODT) monolayers have been shown to improve charge transfer in such devices. The present work is an effort to understand these monolayers through studies of ODT on single crystals of ZnO with well-defined oxygen-terminated or zinc-terminated surfaces. Both bare and ODT- functionalized surfaces were characterized with atomic force microscopy, Fourier transform infrared spectroscopy, x-ray photoemission spectroscopy, and water contact angle measurements. ODT seemed to form islands of multilayers on zinc-terminated surfaces and islands of monolayers on oxygen- terminated surfaces. While ODT was expected to preferentially bond along defects and terraces on oxygen-terminated surfaces, this was not observed. ODT was also expected to more effectively bond to the zinc-terminated surface, which was observed. This work was supported by the National Science Foundation Division of Materials Research DMR-0606054, DMR-0907409, and the Renewable Energy Materials Research Science and Engineering Center at the Colorado School of Mines.

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