

Abstract Submitted  
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**Optimization of Nanostructured ZnO / Conjugated Polymer Photovoltaic Devices** DANA OLSON<sup>1</sup>, YUN-JU LEE, ERIK SPOERKE, DARREN DUNPHY, JAMES VOIGT, JULIA HSU, Sandia National Labs, MATTHEW WHITE, Univ. of Colorado, SEAN SHAHEEN, DAVID GINLEY, National Renewable Energy Lab — Nanostructured oxide semiconductor / conjugated polymer composites are promising systems for low cost photovoltaic devices. The use of nanostructures increases the heterojunction areas, resulting in more effective capturing of photogenerated charges. We have fabricated arrays of ZnO nanorods by low-temperature solution growth on patterned ITO substrates. The dense ZnO nanorod arrays are subsequently infiltrated with poly(3-hexylthiophene) (P3HT), and the devices are completed by depositing Ag top electrodes. Depending on the seeding conditions, we can control the alignment of ZnO nanorods on ITO: ordered (aligned perpendicular to the substrate) versus disordered. We will study the effects of nanorod array morphology and growth chemistry, as well as processing conditions used to infiltrate P3HT into the ZnO nanorod arrays. We will also examine surface treatment and modification of ZnO prior to polymer infiltration to enhance electron transfer efficiency at the ZnO/P3HT heterojunctions. Finally, these results are correlated with the device data to observe the effects of ZnO nanorod ordering, interfacial treatment, and the infiltration process on the device performance.

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