Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Enhanced Optical Absorption of Glancing Angle Deposited Semiconducting Nanostructures for Photovoltaic Solar Cell Applications HILAL IS, MEHMET CANSIZOGLU, Department of Applied Science, University of Arkansas at Little Rock, Little Rock, AR, 72204, MIRIA FINCKENOR, NASA Marshall Space Flight Center, AL 35812, TANSEL KARABACAK, Department of Applied Science, University of Arkansas at Little Rock, Little Rock, AR, 72204 — Semiconducting nanostructures with controlled geometries can provide enhanced optical absorption and effective collection of photo-charges for high efficiency photovoltaic solar cells and photoconductive devices. Glancing angle deposition (GLAD) provides a unique capability of producing nanostructured arrays of various materials with controlled shapes, size, and separation. In this study, as a model system, we fabricated arrays of semiconducting indium sulfide nanostructures by GLAD in the shapes of springs, screws, rods, and zigzags. We show that GLAD nanostructures have significantly lower reflectance and higher optical absorption compared to conventional flat thin films. In addition, we observed a superior photoconductivity (PC) response of about 80% for nanorod array samples, which is believed to be mainly due to their high optical absorption. On the other hand, PC response was less than 1% for conventional thin films of indium sulfide.

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Date submitted: 29 Nov 2010 Electronic form version 1.4