

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

ZnO Nanoparticles and Nanowire Arrays with Liquid Crystals for Photovoltaic Applications¹ LOURDES SALAMANCA-RIBA, NICHOLAS WEADOCK, LUZ MARTINEZ-MIRANDA, University of Maryland — Liquid crystals are small monodisperse molecules with high mobilities and are easy and cheap to process. In addition, some of their phases exhibit molecular orientation that can provide a path for the electrons, or holes, to move from one electrode to the other. We have mixed a smectic A liquid crystal (8CB) with varying concentrations of ZnO nanoparticles of ~ 5 nm in diameter and have observed a photovoltaic effect as a function of the concentration of ZnO. The liquid crystal is believed to enhance the alignment of the nanoparticles and aid in the diffusion of electrons through the particles to the collection electrode. We have also made PV cells of ZnO nanowire arrays grown on Au layers on Si substrates. The nanowire arrays are covered with 8CB liquid crystal for hole conduction. We compare the light absorption of the PV cells as a function of wavelength of the light for the ZnO nanoparticle and the ZnO nanowire cells. We present a detailed study of the structure of the two systems.

¹Supported by the National Science Foundation under the University of Maryland MRSEC DMR 0520471.

Lourdes Salamanca-Riba
University of Maryland

Date submitted: 26 Nov 2010

Electronic form version 1.4