Abstract Submitted
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Investigation of low-cost Cu2O-CuI based photovoltaic devices with near infrared response[1] RYAN LANDRY, Department of Physics, University of West Georgia, Carrollton, GA 30118, P.K.D.D.P. PITIGALA, Department of Physics and Astronomy, Georgia State University, Atlanta, GA 30303, AJITH DESILVA, Department of Physics, University of West Georgia, Carrollton, GA 30118, A.G.U. PERERA, Department of Physics and Astronomy, Georgia State University, Atlanta, GA 30303 — Recently there has been a growing interest in thin films formed from low-cost, non-toxic semiconducting materials due to the promise shown for use in a wide variety of applications ranging from solar cells to environmental purification. In this study, we form n-type copper (I) oxide (n-Cu2O) thin films by boiling copper electrodes in copper (II) sulfate (CuSO4) solutions of varying molarity. Thin films of p-type copper (I) iodide (p-CuI) are then formed over the n-Cu2O films - thus completing p-n heterojunctions that are studied as photon-detecting devices with near infrared response. The devices have a final configuration of glass/FTO/Cu/n-Cu2O/p-CuI/graphite-FTO/glass. We characterize these devices via responsivity, capacitance-voltage (CV), and ultraviolet-visible-near infrared (UV-VIS-NIR) spectroscopy measurements. A peak photoresponsivity of 75mA/W at 575nm and 1mA/W at 943nm is observed at room temperature. The response data also indicates a variation in device response with film thickness – we are making efforts to optimize these films to increase performance.

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