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Fabrication and electrical characterization of CdO/p-Si photosensors

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Abstract

CdO nanorods were grown by sol-gel technique and the structural properties were analyzed by X-ray diffraction and AFM measurements. CdO films were grown onto p-type silicon substrates. Optical band gap was determined by optical absorption. The optical band gap of the CdO film was changed by Al dopant. Heterojunction diodes based on undoped and aluminum doped CdO/p-Si were fabricated using sol-gel spin-coating technique. The effect of light intensity on junction properties of the diodes was studied. The ideality factor of the diodes were obtained to be 2.30, 2.95, and 2.80, for undoped, 0.1%, and 1.0% for Al doped CdO diodes, respectively. The transient photocurrent results indicate that photocurrent under illumination is higher than the dark current. The on/off ratio values of the diodes were observed to be 5.84, 7.50, and 3.96 for undoped, 0.1%, and 1.0% Al doped CdO respectively. The observed decrease in the capacitance and increase in the conductance with increase in frequency was explained on the basis of interface states. The obtained results indicate that the photoresponse properties of the CdO/p-Si are controlled by Al doping. (C) 2014 Elsevier B.V. All rights reserved.

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