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Determination of Defect Distribution in a Ga-rich ZnO/CdS/Cu(In,Ga)Se₂ Solar Cell by
Admittance Spectroscopy

Habibe BAYHAN

Department of Physics, Muğla University, 48000 Muğla-TURKEY

e-mail: hbayhan@mu.edu.tr

 [Keywords](#)

 [Authors](#)



phys@tubitak.gov.tr

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Abstract: This article presents a study on the energy distribution of defects in efficient thin film ZnO/CdS/Cu(In,Ga)Se₂ heterojunction solar cell by the use of admittance spectroscopy. The capacitance spectra of the device has been analyzed using a model based on the existence of a homogeneous distribution of bulk acceptors in the absorber Cu(In,Ga)Se₂ layer. This model reveals an emission from a distribution of hole traps centered at an activation energy of about 300 meV with a defect density of $1.2 \times 10^{17} \text{ eV}^{-1} \text{ cm}^{-3}$. The band gap of the absorber layer is estimated to be about 1.46 eV which corresponds to a Ga content of about $x \approx 0.7$ with x the ratio $\text{Ga}/(\text{Ga}+\text{In})$.

Key Words: CIGS, solar cell, admittance spectroscopy, defect distribution.

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