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Thermal Degradation of BZO Layer on the CIGS Solar Cells

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We investigated a study on the thermal degradation of boron doped zinc-oxide (BZO) layer which used as a transparent conducting layer on the Cu (In_{1-x}Ga_x) Se₂ (CIGS) based thin film solar cells. Devices were annealed under the temperature of 100°C or 100 hours and then Hall measurement was carried out to characterize the parameters of mobility (μ_{Hall}), resistivity (ρ), conductivity (σ) and sheet resistance (Rsh). The initial values of μ_{Hall} , ρ , σ and Rsh were 29.3 cm²/V · s, 2.1×10⁻³ Ω · cm, 476.4 Ω⁻¹ · cm⁻¹ and 19.1 Ω/□ respectively. After the annealing process, the values were 4.5 cm²/V · s, 12.8×10⁻³ Ω · cm, 77.9 Ω⁻¹ · cm⁻¹ and 116.6 Ω/□ respectively. We observed that μ_{Hall} and σ were decreased, and ρ and Rsh were increased. In this study, BZO layer plays an important role of conducting path for electrons generated by incident light on the CIGS absorption layer. Therefore, the degradation of BZO layer characterized by the parameters of μ_{Hall} , ρ , σ and Rsh, affect to the cell efficiency.

Keywords: CIGS, BZO, Thermal degradation