

# STUDY PREPARATION AND CHARACTERIZATION OF Cd (S<sub>0,5</sub> Te<sub>0,5</sub>) SEMICONDUCTOR FOR SOLAR CELL Ariswan, Warsono, Rita Prasetyowati Abstract

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## ABSTRACT

This study aims to determine the crystal structure and lattice parameters of massif Cd(S<sub>0,5</sub>Te<sub>0,5</sub>) results of preparation with Bridgman technique, to determine the surface morphology and chemical composition of massif Cd(S<sub>0,5</sub>Te<sub>0,5</sub>) results of preparation with Bridgman technique. This study also aims to determine the crystal structure and lattice parameters of Cd(S<sub>0,5</sub>Te<sub>0,5</sub>) thin film as a result of preparation with vacuum evaporation technique, to determine the surface morphology and chemical composition of Cd(S<sub>0,5</sub>Te<sub>0,5</sub>) thin film as a result of preparation with vacuum evaporation techniques. , knowing the resistance of thin film Cd(S<sub>0,5</sub>Te<sub>0,5</sub>) as a result of preparation with vacuum evaporation technique, and knowing the band gap energy of Cd(S<sub>0,5</sub>Te<sub>0,5</sub>) thin film prepared by vacuum evaporation technique.

The research carried out includes two stages, namely the preparation stage and the characterization stage. The preparation stage consisted of growing massif Cd(S<sub>0,5</sub>Te<sub>0,5</sub>) by the Bridgman method and the growth of a thin layer of Cd(S<sub>0,5</sub>Te<sub>0,5</sub>) with vacuum evaporation technique. Characterization of XRD (X-Ray Diffraction) was carried out to determine the massive crystal structure and thin layer of Cd(S<sub>0,5</sub>Te<sub>0,5</sub>) SEM (Scanning Electron Microscopy) characterization was carried out to determine the surface morphology of the massif and thin layers, while the characterization of EDS (Energy Dispersive Spectroscopy) was carried out to determine the chemical composition of the mass and thin layers. Characterization using a four-point probe was carried out to determine the resistance of the thin film Cd(S<sub>0,5</sub>Te<sub>0,5</sub>). Characterization with UV-Visible Spectrophotometer was carried out to determine the energy gap of the Cd(S<sub>0,5</sub>Te<sub>0,5</sub>) thin film.

The XRD characterization results show that the Cd massif (S<sub>0,5</sub>Te<sub>0,5</sub>) formed has a hexagonal structure, with a crystal lattice parameter in sample 1 that is  $a = 4,550 \text{ \AA}$ ;  $c = 7,902 \text{ \AA}$ , for sample 2 that is  $a = 4,538 \text{ \AA}$ ;  $c = 7,944 \text{ \AA}$ , and for sample 3 is  $a = 4,533 \text{ \AA}$ ;  $c = 7,902 \text{ \AA}$ . SEM characterization results show that the surface morphology of Cd massif (S<sub>0,5</sub>Te<sub>0,5</sub>) is quite homogeneous, with the average grain size in sample 1 that is  $x = 10,584 \pm 0,176 \text{ micron}$  and  $y = 10,115 \pm 0,982 \text{ micron}$ , whereas in sample 2 that is  $x = 9,292 \pm 0,005 \text{ micron}$  and  $y = 8,297 \pm 0,105 \text{ micron}$ . The EDS characterization results show that the Cd: S: Te massif Cd (S<sub>0,5</sub>Te<sub>0,5</sub>) ratio in sample 1 is 1: 0.3: 0.6, and in sample 2 is 1: 0.2 : 0.8.

Kata Kunci: *Keywords: Cd (S<sub>0,5</sub>Te<sub>0,5</sub>), massif, thin film, solar cell*