

STRUCTURE AND CHEMICAL COMPOSITION OF SEMICONDUCTOR MATERIALS SnSe PREPARATION OF THIN LAYER USING VACUUM EVAPORATION

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ABSTRACT

This study aims to obtain the crystal structure, surface morphology and chemical composition of thin film of SnSe prepared by using vacuum evaporation method and to determine the effect of variations spacers distance in the thin film of SnSe.

SnSe thin film preparation was done process at a pressure of 2×10^{-5} mbar and a substrate temperature of 600°C using evaporation method. SnSe thin film preparation process was done by giving spacer between the substrate and the source at 10 cm, at 15 cm and at 25 cm. Characterization process was performed using X-ray diffraction (XRD) to determine the structure of a thin film, Scanning Electron Microscopy (SEM) to determine the thin film of surface morphology and Energy Dispersive X-Ray Analysis (EDAX) to determine the chemical composition of the thin film.

XRD characterization showed that sample 2 and sample 3 SnSe crystal is polycrystalline and their crystal structure was orthorombik. As for sample 1, it was also polycrystalline, but not orthorombik. SnSe crystal sample 1 has a value of lattice parameters $a = 11.32 \text{ \AA}$ for spacer of 10 cm. SnSe crystal sample 2 has a value of lattice parameters $a = 11.38 \text{ \AA}$, $b = 4.17 \text{ \AA}$, $c = 4.48 \text{ \AA}$ for spacer of 15 cm. SnSe crystal sample 3 has a value of lattice parameters $a = 11.46 \text{ \AA}$, $b = 4.09 \text{ \AA}$, $c = 4.62 \text{ \AA}$ for spacer of 25 cm. SnSe crystal preparation results with 10 cm spacer variation has better quality than the crystals with the variation of spacer 15 cm and 25 cm in terms of intensity and FWHM values. SEM characterization results indicate that SnSe surface morphology of the crystals formed fairly evenly. Results of EDAX analysis, showed that the comparison of the percentage of crystalline Sn to Se thin layers was 1: 0.919

Key words : material characteristics, semiconductor SnSe, evaporation method.