

**EFFECT OF ANNEALING TEMPERATURE ON STRUCTURAL, MORPHOLOGY AND OPTICAL PROPERTIES ON ZnS THIN FILMS BY SOL-GEL METHOD**

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**ABSTRACT**

Zinc sulphide (ZnS) thin films were prepared by the sol-gel technique. This study focused on nanocrystalline structure and optical properties in four different temperature which are at 250 °C, 300 °C, 350 °C and 400 °C on quartz slide. The obtained reaction product was a transparent and colloidal solution. SEM, EDX, XRD, UV-Vis and PL were used to characterize the sample. SEM shows the film are thicker and have bigger grains size at 400 °C compared to the film at 250 °C with the grain size between 39.0 - 63.3 nm and 22.3 - 29.0 nm respectively. EDX analysis confirmed the thin film consisted of zinc and sulphur. XRD shows development of well-crystallized film with pure wurtzite structure after annealing. XRD spectrum indicates that the films are amorphous and have cubic zinc blend structure. The films also shows good optical properties with high transmittance of range 85 % - 95 % in the visible region and the band gap value are around 3.8 eV. Photoluminescence have been studied and the film annealed at 250 °C was existed in blue transmission spectrum in visible region at wavelength about 490 nm. While for the annealed temperature at 300 °C, 350 °C and 400°C are exist at green transmission spectrum in visible range having wavelength in between of 495 nm to 497 nm.

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