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Preparation and study optical transparency of spray deposited ZnS films with different annealing temperatures

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Abstract:

The article reports the preparation of ZnS films prepared by chemical method. The band gap of ZnS films is calculated their value are nearly of (4 eV) for all samples. The experimental diffraction angle θ and d-spacing values are in a well agreement with the standard ASTM data at all annealing temperature used (450,500,550,600 oC) of ZnS thin films. The grain size (D) increases with increasing temperature. The increase in the temperature of annealing leads to lower peaks of x-ray diffraction pattern for structural analysis. The thickness of the prepared film is around (283nm).

Keywords: Zinc sulphide; spray pyrolysis, thin films, UV spectrophotometer, Optical properties, X-ray diffraction.

1. Introduction:

ZnS is today clearly regarded as thin films materials. ZnS sintered film may be suitable for solar cells, Wide band gap window material and other photovoltaic devices. The analysis of the optical film properties naturally enforces the application of the theoretical and experimental skills of thin film optics to the mentioned molecular system [1-3]. Another important fact emphasizes the significance of thin film spectroscopy in application to condensed molecular matter. The point is, that due to the weak Van der Waals interaction between molecules in comparison with the

free molecule [2-4]. ZnS is exceptionally interesting for the photo-induced nonlinear optical effects[5], and it possesses a specific number of defect states which may be of interest for the different applications [6] These materials are generally n-type semiconductors and have the advantage of being sufficiently stable towards chemical and thermal treatment. They can easily be sublimed and resulting in high purity thin films without decomposition. There are several methods for depositing ZnS thin films, such as; spin