DETERMINATION OF STRUCTURAL AND PHOTOELECTRIC CHARACTERISTICS OF ZnO POLYCRYSTALLINE THIN FILMS AND ZnO NANOROD ARRAYS OBTAINED BY SPRAY PYROLYSIS

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ZnO polycrystalline thin films and ZnO nanorod arrays were obtained by spray pyrolysis method, at a substrate temperature of 450 °C. From the analysis of the XRD diffractograms, the hexagonal crystal structure of the ZnO films and ZnO nanorods was determined. On the other hand, the grain sizes of the films and nanorods were determined using the Debye-Scherrer relation. The optical properties of the films and nanorods were determined by measuring the dependence of the transmission on the wavelength of the light. Also, the optical band gap of 3.28 eV for the ZnO films and 3.20 eV for the ZnO nanorods were estimated. The photoconductivity spectrum of thin films and nanorods was performed in the visible light range and their photoconductivity was studied when they were illuminated by X-rays, where the incident X-rays increase the conductivity of thin films and nanorods. The surface morphology of the ZnO films and the ZnO nanorods were studied by a scanning electron microscope, as well as the grain size of the film and the dimensions of the nanorods.

Key words: Zinc oxide, optical band gap, photoconductivity, surface morphology