

SSNN 5P SYNTHESIS OF ZnO THIN FILMS ON Zn SUBSTRATE BY ONE STEP HYDROTHERMAL METHOD

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Nanosized materials present a high interest because of their potential applications in nanodevices and as functional materials. These applications are due to their properties, controllable morphology, size and shape. Zinc oxide nanomaterial is intensively studied because is a semiconductor with low toxicity, good chemical and thermal stability, large specific surface area and high electron mobility [1].

In this paper the ZnO nanomaterial was successfully synthesized by hydrothermal method on Zn substrate. For hydrothermal synthesis of ZnO nanomaterial on Zn substrate, zinc nitrate hexahydrate, urea and sodium hydroxide (1M) were used as precursors. Hydrothermal synthesis was carried out at 220°C for 5hours. The final product it was a thin film of ZnO on Zn substrate. This material was characterized by means of x-ray diffraction (XRD), scanning electron microscopy (SEM), energy – dispersive x-ray spectroscopy (EDX) and photoluminescence (PL).

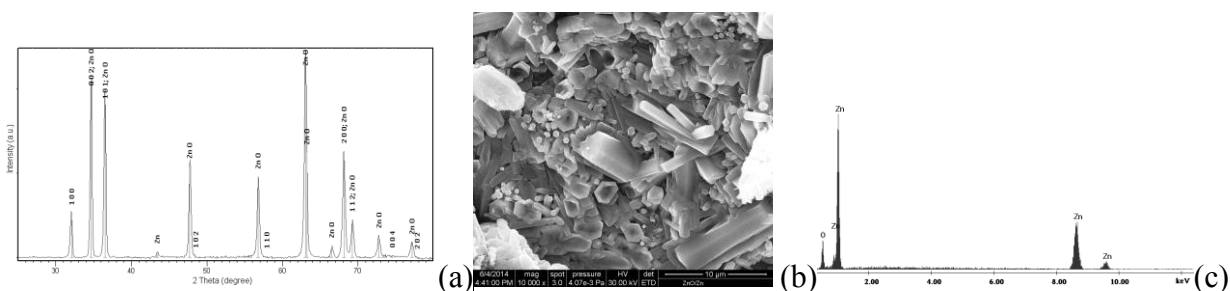


Fig. 1. (a) X-ray diffraction pattern, (b) SEM image and (c) EDX spectrum of ZnO thin film on Zn substrate.

X-ray diffraction (fig.1 a) analysis shows a single phase for ZnO nanomaterial. Almost all diffraction peaks can be attributed to hexagonal ZnO according to JCPDS card no. 01-079-0205, and a small peak situated at $2\theta = 43.4^\circ$ which can be due to the zinc substrate.

The morphology of ZnO structures deposited on Zn substrate was observed by SEM (fig. 1 b). The microstructure of ZnO thin film consist of nanoparticles with a rods aspect for which were calculated average value of crystallite sizes, showing the thickness around of 35.3 nm and length 890 nm.

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[1] G.Z. Jia, Y.F. Wang, J.H. Yao, *J. Phys. Chem. Solids* **73** (2012) 495.