

Solid state synthesis of ZnO nanostructures: effect of temperature on the structural and Optical properties

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Abstract : Among the different approaches to synthesize nanostructured ZnO, the solid state synthesis is one of the simplest methods to elaborate the ZnO nanoparticles. In this work we obtained nanostructured ZnO by aforesaid method using zinc nitrate tetrahydrate $\text{ZnO}(\text{NO}_3)_2$ as precursor. The influence of calcination temperatures as 300, 400, 500 and 600°C, on the crystallite size and the optical properties was investigated by X-Ray diffraction and UV-visible spectroscopy, respectively. The results obtained by XRD confirm that the diameter of nanocrystallites was affected by the calcinations temperature. The UV-visible absorbance spectra of the synthesized samples reveals that the calcinations temperature plays a significant role in the absorption characteristics, and influences the optical band-gap of the samples. Raman and FT-IR spectroscopy were performed to investigate the structural, vibrational and chemical properties of the ZnO nanostructures.

Keywords : ZnO nanostructure, FTIR, UV-Vis, solid state synthesis