Based on the interesting optoelectronic properties of ZnO, it has become in one of the most important semiconductor oxides. Depending on the application it has been processed in different forms, namely, thin or thick film, as well as powder. In this work we are focusing in synthesizing ZnO nanoparticles by using water-in-oil (w/o) microemulsions. The use of inorganic phase w/o microemulsions has received considerable attention for preparing metal particles. In the synthesis of nanomaterials, w/o-type nano-reactors commonly used, the chemical reactions occur in the aqueous phase. In general, zinc acetate dihydrate (Zn(CH₃COO)₂·H₂O) and sodium hydroxide (NaOH) have been adopted as synthesis precursors for producing of ZnO nanostructures. Since the metal salts and reducing agents are mostly soluble in water, then the nucleation of the metal particles proceeds in the aqueous phase of the microemulsion. In this work is presented the preparation of ZnO in inverse microemulsion systems. The effect of the microemulsion route type and the concentration of the components in the system, as well as the relative amounts of oil and surfactant present, hydrophilic lipophilic balance (HLB), surfactant to oil ratio (SOR) and water to oil ratio (WOR) is studied. Additionally, the influence of other parameters such as temperature and reaction conditions is also analyzed. Reaction was developed by basic hydrolysis of zinc acetate by controlling the reactant concentrations in the w/o microemulsion of Span-Tween 80 mixture/aqueous solution/emu oil. The resultant precipitate in the process was dried and calcined to produce ZnO powders. The crystallinity of the ZnO particles was confirmed by X-ray diffraction (XRD). Information about the size and distribution of the particles was obtained from Transmission Electron Microscopy (TEM).

Keywords: Microemulsion, Zinc oxide powers, X-ray diffraction

References:


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