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Preparation of ZnO/$Zn(OH)_2$ in Alkaline Medium Using Chemical Precipitation

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The increasing demand for materials that meet the requirements of new applications of high technology, leading to an exponential increase of the methodologies and techniques to produce them. It is essential to identify and quantify the characteristics of a new material having these highly specific demands, considering a nanometer scale. ZnO is a material showing a big challenge in its characterization as a great diversity in morphology and particle size. In the scientific literature can be found many papers that indicate that these features are related to the combination of the synthesis conditions. Crystallographically the thermodynamically most stable phase is ZnO known as wurtzite, without forgetting the importance of the chemical composition as it is possible to obtain this hexagonal structure with different chemical species such as $Zn(OH)_2$, ZnO and ZnS. However one of the major challenges for the characterization of ZnO and its related species to study their possible morphologies that can be kind of spheres, wires, stars, sheets, rods, columns, among others several others [1-2] .

Two solutions were prepared by taking the stoichiometric ratio of $ZnSO_4 \bullet 7H_2O_{(aq)} + 2B(OH)_{(aq)} \rightarrow B_2SO_{4(aq)} + Zn(OH)_{2(s)}\downarrow$, the solution of $ZnSO_4 \bullet 7H_2O$, B = NaOH for ZnOA0 case, B = NH_4OH for ZnOB0 and B = KOH for ZnOC0 sample. Drop wise a solution of $ZnSO_4$(aq) to the alkaline solution is added. During the addition, the mixture is kept stirring for reception and ambient temperature of 25 °C, the addition time is 45 minutes, at the end of this addition is still kept under stirring for 30 min. Subsequently, the obtained precipitates were centrifuged and washed with distilled H_2O at room temperature to remove Na_2SO_4 formed in the reaction, checks for SO_4^{-2} by addition of drops of 1% solution of $BaCl_2$. After washing wet pastes are dried at 110 °C for a period of 180 min.

By using Scanning Electron Microscopy (SEM) particle morphology (Figure 1) was identified for the elemental composition were obtained from each sample three different fields obtain 6 by Energy Dispersive spectra Spectrometer (EDS) were analyzed. The distribution of chemical composition of the solids was for all ZnOB0 case is the presence of sulfur is about 5% while absent in the other two. In no case was one of the samples to have the ratio of 1:2 with respect to oxygen Zinc

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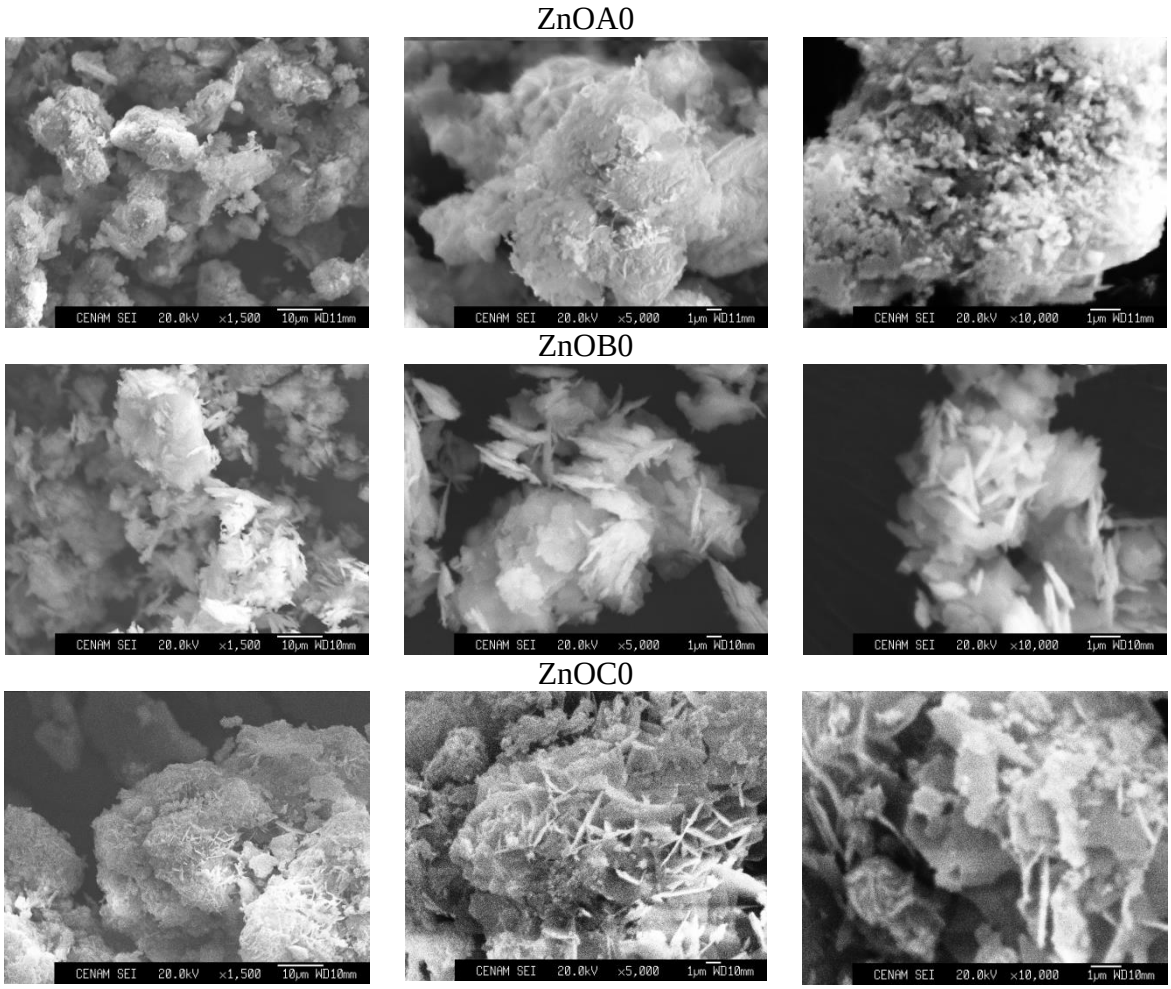

.**Figure 1.** Identification of the morphology obtained in the three different routes of synthesis with NaOH precipitant ZnOA0, ZnOB0 with NH4OH and KOH ZnOC0 All samples are not calcined.

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