DILUENT SOLVENT EFFECT ON THE STRUCTURAL AND MORPHOLOGICAL PROPERTIES OF ZNO AEROGELS PREPARED BY THE MODIFIED SOL-GEL PROCESS

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Abstract

ZnO aerogels have been synthesized via a modified sol-gel process using several solvents as solution diluent. The solution was obtained by dissolving zinc acetate dehydrate in methanol solvent under continuous magnetic stirring. Then, the transparent solution was diluted with a miscible solvent (ethyl alcohol, acetone and methanol) to obtain 0.20 M sol concentration. The homogeneous and transparent solution was placed in an autoclave and dried under supercritical conditions of the used diluent solvent. After cooling down to ambient temperature of the autoclave, a white powder was recuperated and analyzed without any heating or chemistry treatments.

The as-prepared nanostructured aerogels with different diluent solvents were investigated by X-ray diffraction (XRD), scanning electron microscope (SEM), energy dispersive X-ray spectroscope (EDX) and Fourier transform infrared spectroscopy (FTIR). The results show that the co-solvent affects not only the morphologies of the crystallites but also, the lattice parameters and the crystalline quality of the elaborated ZnO aerogels. The sol-gel modified process can be considered as an effective route for large-scale synthesis of the nanostructured metallic oxides aerogels for use in optoelectronic and catalysis.

Keywords: ZnO, modified sol-gel, solvent effect, XRD

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