Obtaining of pure and In-doped ZnO nanoparticles and thin films by chemical route

Ariane Porto Ruiz[1], Camila Rodrigues Sciena[1,2], Paola Thaís Spolaôr Falcão[1], Lílian Cruz Santos[1], Elaine Cristina Paris[2]

[1]Universidade Federal de São Carlos - Campus: São Carlos, [2]Embrapa Instrumentação Agropecuária - São Carlos

e-mail: nanequimicaufscar@gmail.com

Nanostructured ZnO materials have received broad attention due to their distinguished performance in electronics, optics and photonics. The synthesis of ZnO thin films has been an active field because of their applications as sensors, transducers and catalysts. This project aims to synthesize and characterize nanostructured pure and In-doped ZnO in the form of powders and films. The films were obtained by polymeric resins submitted to thermal treatment. In its turn, the resins were made from the polymeric precursor method. For this, the precursors used were zinc acetate and indium chloride. In this way, was realized an optimization of the experimental procedure for the films obtainment using pure ZnO and In-doped ZnO powders in a ratio (w/w) from 10, 5, 4, 3, 2 to 1%. The powders were characterized by X-ray diffraction (XRD), thermogravimetric analysis (TGA), scanning electron microscopy with field emission gun (SEM-FEG) and infrared scpectrocopy (FTIR). Thorough the collected results were observed that the obtained phase of ZnO was the wurtzite, and it was enquire that the crystallinity raise of the materials is due to temperature increasing on the thermal treatment. The initial polymeric depositions for the films were realized on the surface of a commercial glass subtracts from two techniques, spin and dip-coating. For this, the resins viscosity and the cleaning methods for the substrates were varied for optimization of the methodologic parameters. In summary the results obtained in these procedures indicates that is possible to derive a homogeneous films of pure ZnO from the utilized technique and insert the In as a addictive.