

## FORMATION AND CHARACTERIZATION OF ZNO NANOPARTICLES

MUSIC Svetozar, PETROVIC Zeljka, RISTIC Mira, SEPIOL Bogdan, PETERLIK Herwig

*Rudjer Boskovic Institute, Zagreb, Croatia  
University of Vienna, Faculty of Physics, Vienna, Austria, EU*

### Abstract

A simple and reproducible procedure for the preparation of ZnO nanoparticles will be shown. It is based on the alkali precipitation from zinc gluconate solution, followed by ageing the precipitation system at room temperature. For a proper time of ageing between 1 and 60 days the isolated precipitates from so obtained suspensions were heated at 300 oC. The sizes of all prepared ZnO particles (crystallites) were in the nanosize range. The crystallite sizes of ZnO were determined using the well-known Scherrer formula. There was no significant difference among the values for different crystallographic directions, thus indicating that there is no significant preferential crystallites orientation in ZnO particles. The chemical binding (chemical adsorption at outer and inner surfaces) of gluconate by zinc(hydrous)oxide precursor played important role in the formation of ZnO nanoparticles (nanocrystallites). XRD pattern showed amorphous nature of zinc (hydrous)oxide precursor. SAXS analysis of zinc (hydrous)oxide precursor showed the presence of structural units in the sample with a mean distance of 1.5 nm. This is attributed to the typical distance of the adsorbed gluconate groups, supported by spectroscopic measurements. Optical spectra were recorded and the band gap gradually decreased from 3.25 eV to 3.05 eV for ZnO samples produced from initially precipitated suspensions aged between 1 and 60 days.

**Keywords:** ZnO, nanoparticles, XRD, SAXS, FE SEM

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