Contribution ID: **572** Type: **Poster**

Thermal decomposition synthesis and magnetic properties of crystalline zinc oxide powders

Tuesday 22 May 2018 15:15 (15 minutes)

Crystalline zinc oxide powders are prepared by a direct thermal decomposition of zinc nitrate hexahydrate in air at 500 oC for 2 h. The thermal behavior of zinc precursor compound was studied using TG-DTA analysis in order to define the ZnO formation temperature. The structure of the calcined sample was characterized by X-ray diffraction (XRD). The XRD result indicates that the sample has a pure phase with ZnO wurzite structure. The morphology and elemental composition have been identified through SEM and EDX analyses. The oxidation state of ZnO sample was investigated using X-ray absorption near-edge spectroscopy (XANES). The ZnO sample reveals ferromagnetic behavior with the magnetization of 0.50 emu/g at 15 kOe. Our results indicate that room-temperature ferromagnetism of ZnO is intrinsic.

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Session Classification: A016: Magnetic and Semiconductor (Poster)

Track Classification: Magnetic and Semiconductor Physics