

Fabrication of highly selective sensor based on Mn-doped ZnO nanostructures

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1 mol% of Mn²⁺, Fe³⁺-doped and single phase hexagonally plate ZnO have been synthesized by a simple low temperature hydrothermal method using D-ribose as a template. The influence of the doped species on structural, optical and sensing property was studied by X-ray diffraction (XRD), scanning electron microscopy (SEM), UV-vis spectra, photoluminescence (PL) and gas sensor characterization system. The results show that the doped species have significant effect on morphology, crystallite size, photoluminescence and sensing properties. Mn-doped ZnO sensor shows selective response to acetone in presence of CO and ethanol while, Fe-doped ZnO does not show considerable response to CO, ethanol and acetone gases. Probably, the crystal defects are detected by photoluminescence account for the different sensing

behaviors. A possible mechanism of how a doped ZnO-based sensor response to the target gas is also proposed by density functional theory (DFT) calculations.

Biography

Azam Anaraki Firooz received MSc and PhD degrees in Inorganic Chemistry from Tarbiat Modares University in 2005 and 2010, respectively. She joined Shahid Rajae Teacher Training University in Tehran in 2011. Her research interests include the effect of morphology and additives on sensing and photocatalytic functions of oxide nanostructures.

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