

Characteristics of SnO₂:Ga powder prepared by the liquid drop fluidized reactor for liquid component detection

임대호, 유동준, 이찬기¹, 강경민², 강 용†
충남대학교; ¹고등기술연구원; ²젠텍
(kangyong@cnu.ac.kr†)

Optical and electrical characteristics of Ga doped SnO₂ powder prepared by the liquid drop fluidized reactor were investigated to develop the sensor material for the detection of liquid component in the room-temperature. Effects of Ga content doped into the lattice of SnO₂ host material on the optical and electrical properties of SnO₂:Ga were examined. Sn⁴⁺ in the host lattice was successfully substituted by Ga³⁺, which resulted in the charge transfer at the surface of SnO₂:Ga in order to maintain the charge balance. The substitution of Sn⁴⁺ by Ga³⁺ was identified by means of XRD analysis : The main peak of XRD was shifted slightly to the low angle with an increase in the Ga content doped into the lattice of SnO₂. The charge transfer was analyzed by means of UV-visible absorption spectra and PL spectra. The doping of Ga into SnO₂ could reduce the band gap energy, which was analyzed by using the DRS analysis. The room-temperature UV-visible absorption spectra exhibited that the as-prepared SnO₂:Ga could respond to the methyl alcohol, ethyl alcohol, isopropyl alcohol and ammonium hydroxide within 5 seconds.