

Influence of Pt on structural and morphological properties of La₂O₃/SnO₂ thick film

ABSTRACT

In this study, the effect of Lanthanum oxide doped tin oxide (La₂O₃/SnO₂) surface modification by Pt synthesized in the structural properties of SnO₂ was presented. Samples (2wt.% La₂O₃, SnO₂, 2 wt.% La₂O₃, SnO₂, 1 wt.% Pt) were prepared using the ball milling method with m-xylene medium and they were calcined under 700 °C. The thick film resistive paste based on SnO₂ was fabricated on alumina substrate using screen printing technique. In order to prepare the printable thick film paste, the calcined resistive powders were mixed with organic vehicle and glass frit on alumina substrate with good rheology. Afterward, thermal treatment (drying and firing) was applied to dry the solvent from the printed paste and bonding the resistive paste on alumina substrate. The particle size and crystallinity of samples were characterized using X-Ray Powder Diffraction (XRD) spectroscopy and Transmission Electron Microscopy (TEM). TEM results illustrate that the obtained material are nanoparticles in spherical shape and the size of particles decreases with addition of Pt. The XRD pattern results show that the prepared samples are the nanopowders with almost spherical crystalline structure. The thick film surface morphology was investigated by Field Emission Scanning Electron microscopy (FE-SEM) before and after Pt doping and Energy Dispersive X-Ray spectroscopy (EDX) was used to determine the elemental composition. The results proved the nanometric size of all particles and it illustrated that the particle size of materials decreased with the addition of Pt on La₂O₃/SnO₂.

Keyword: Nanocrystalline materials; Particle size; SnO₂; Catalytic additives.