Influence of Pt on structural and morphologycal 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 under700 °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 solvant 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.