Impedance spectroscopy and transport properties measurements in lithium and titanium co-doped nickel oxide

Reginaldo Muccillo, Fbio Henrique Pimentel, Renato F. Jardim, Eliana Navarro Dos Santos Muccillo

Nuclear and Energy Research Institute - Brazil

Abstract

Impedance spectroscopy measurements in the 10 Hz - 10 MHz frequency range were carried out in nickel oxide pellets sintered with addition of lithium and titanium oxides. The (-Z"(w) x Z'(w)) impedance diagrams, measured in the 77 K - 630 K temperature range, show the dependence of the electrical resistivity on the microstructural modification - contribution of point defects - as a consequence of doping with Li+ and Ti4+ . The temperature dependence of the dielectric response of LixTiyNi1-x-yO (x=0.05, y=0.02) specimens on temperature was evaluated and the giant low-frequency dielectric constant was observed near room temperature. Moreover, a frequency-dependent variation of the real component of the impedance has been detected at the Nel temperature of these compounds. Transport properties measurements performed using the conventional dc four-probe technique will also be reported.