

110-023

Synthesis, characterization and properties of Ca-Sr-Ti-Fe-O compounds

Carmo, J.R.; Muccillo, R.

IPEN

$\text{Ca}(x)\text{Sr}(1-x)\text{Ti}(y)\text{Fe}(1-y)\text{O}(3-d)$ ($0 < x < 1$, $y \sim 0.65$) compounds were synthesized by the ceramic route, namely, mixing and annealing stoichiometric $\text{CaCO}_3 + \text{SrCO}_3 + \text{TiO}_2 + \text{Fe}_2\text{O}_3$ mixtures, and by the polymeric precursor technique. Thermogravimetric and differential thermal analyses of these mixtures and of the polymeric resin were carried out to evaluate the temperatures for phase completion. Room temperature and in situ high temperature (up to 1200°C) X-ray diffraction experiments were performed for structural phase analysis of the compounds. The lattice parameter determinations show the partial to full occupancy with the substitution of Ca^{2+} for Sr^{2+} , and the perovskite ABO_3 cubic structure. Impedance spectroscopy analysis in the 10 Hz - 10 MHz frequency range from 500 to 1300°C in the 10 ppm - 1 atm oxygen partial pressure levels evidences the dependence of the Ca/Sr ratio on the thermally activated process of the electrical conduction in the $\text{Ca}(x)\text{Sr}(1-x)\text{Ti}(y)\text{Fe}(1-y)\text{O}(3-d)$ compounds. (CNEN, CNPq, FAPESP)