Electrochemical characterization of La$_{0.6}$Ca$_{0.4}$Fe$_{0.8}$Ni$_{0.2}$O$_{3-\delta}$ perovskite cathode for IT-SOFC

Electrolyte supported symmetric cells featuring La$_{0.6}$Ca$_{0.4}$Fe$_{0.8}$Ni$_{0.2}$O$_{3}$ (LCFN) electrodes are studied by electrochemical impedance spectroscopy. The aim is to describe the polarization losses of this mixed ionic electronic conductor electrode at various cell operating conditions for cells sintered at different temperatures. An equivalent circuit describing the cathode polarization resistances was constructed from analyzing impedance spectra recorded at different oxygen partial pressures and temperatures. Favorable oxygen reduction reaction properties are demonstrated for the LCFN cell sintered at 750°C with a polarization resistance of 0.05 Ω cm$^2$ at an operating temperature of 800°C in pure oxygen. © 2013 Elsevier B.V. All rights reserved.