

High-Performance (Mn,Co)3O4 Spinel Coating Prepared by Electrophoretic Deposition for Solid Oxide Fuel Cell Interconnects

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Abstract

The evaporation and migration of Cr species from the chromia scale resulted from the presence of water vapor are the main issues of Cr-containing stainless steel interconnects used in high-temperature operation of Solid Oxide Fuel Cell (SOFC). In the present work, electrophoretic deposition (EPD) followed by reduced-atmosphere sintering was carried out in order to produce the desired (Mn,Co)3O4 spinel coatings on SOFC interconnects. The surface evolution and conductivity changes were investigated to evaluate the effect of EPD voltages under applied electric field by means of scanning electron microscopy (SEM), energy dispersion spectrometry (EDS), X-ray photoelectron spectroscopy (XPS), and four-probe resistance techniques. In addition, the influence of reduced-atmosphere sintering on the growth of sub-coating Cr oxide scale and long-term area specific resistance (ASR) of SOFC interconnects were discussed.

Keywords: Solid oxide fuel cell, Interconnect, Electrophoretic deposition, (Mn,Co)3O4 spinel

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