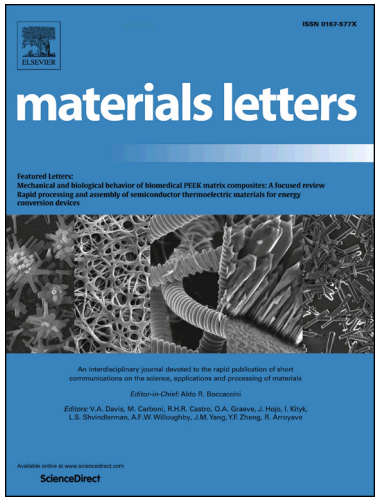

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Electrochemical assessment of one-step Cu-CGO cermets under hydrogen and biogas fuels

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Abstract

CuO-$Ce_{0.9}Gd_{0.1}O_{1.95}$ (CuO-CGO) nanocomposite powders obtained by *in situ* one-step synthesis were used to prepare Cu-CGO cermet anodes for solid oxide fuel cells (SOFCs). The effects of the CuO content (varying from 40 to 60 wt.%) on the lattice parameter and crystallite size of CuO and CGO phases were investigated by X-ray diffraction (XRD) with Rietveld refinement of the XRD data. CuO-CGO composites were screen-printed on both faces of ceria-based substrates, fired at 1150 °C, reduced to Cu-CGO cermets, and electrochemically characterized by impedance spectroscopy in hydrogen and synthetic biogas atmospheres. One-step Cu-CGO anodes with 40 wt.% CuO showed area specific resistances of 0.15 ohm.cm^2 (in hydrogen) and 2.30 ohm.cm^2 (in biogas) at 800 °C. The anode performance is deteriorated by increasing the CuO content to 60 wt.%.

Keywords: Composite materials; electrical properties; impedance spectroscopy, Cu-CGO, SOFC anode.

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