Nickel-ceria infiltrated Nb-doped SrTiO3 for low temperature SOFC anodes and analysis on gas diffusion impedance

This report concentrates on high performance anodes appropriate for SOFCs operating at low temperatures (400–600 °C). Symmetrical cells were made by screen printing of Nb-doped SrTiO3 (STN) on both sides of a dense ScYSZ electrolyte. Backbones I (36% porosity) and II (47% porosity) were obtained by sintering STN in air and reducing atmosphere, respectively. The porous microstructures were then infiltrated with Ni and Gd-doped CeO2 (CGO) precursors to incorporate the electrocatalytically active sites. The electrochemical performance of the anode was improved with the increment of Ni-CGO loadings. The gas diffusion impedance was investigated with He and N2 in H2/H2O gas mixtures and by varying the H2O content at 655 °C. This study indicated that the gas diffusion in these electrodes are influenced by Knudsen and bulk diffusion.

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