



Performance of Nickel-Scandia Stabilized Zirconia Cermet Anodes for SOFCs in 3% H_2O - CH_4

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Abstract

A performance of solid oxide fuel cells (SOFCs) with a nickel-scandia stabilized zirconia (Ni-ScSZ) anode and a nickel-yttria stabilized zirconia (Ni-YSZ) anode was examined at a low steam / methane ratio (S / C) of 3% H_2O - CH_4 . The power density of the cell with the Ni-ScSZ anode showed 0.85 W / cm^2 at 0.85 V at 1273 K without no degradation of power density during over 250 hours. A whisker-shaped graphite was observed on a part of the Ni-ScSZ surface after generation tests. On the other hand, the Ni-YSZ anode showed the power density of 0.8 W / cm^2 at an initial stage and degraded to be 0.6 W / cm^2 after 250 hours. The degradation of the power density could be explained by the formation of amorphous carbon on the Ni-particles by the methane decomposition.

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