

Structural and electrochemical characteristics of rGO-Ni/YSZ and rGO/SYTN anode in solid oxide fuel cells

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Due to high temperature operation, solid oxide fuel cells (SOFCs) can utilize various types of fuel including natural gas, biogas, light hydrocarbon fuels, etc. The hydrocarbon fuels, however, interacts metal-phase anode catalysts resulting to carbon coking and poisoning. To solve this problem, reduced graphene oxide (rGO) is applied to Ni/YSZ anode and SYTN perovskites anode. The microstructure and physical properties of the rGO-added anode were confirmed through XRD, SEM, XPS, IR, and Raman. The rGO phase was stable during cell synthesizing and operating process. Due to the excellent electronic conductivity of rGO, the cell performance improved varying rGO amounts in H₂ and CH₄ fuels. Carbon deposition reduced in the rGO-Ni/YSZ anode comparing to the Ni/YSZ anode. In the SYTN anode, the cell performance was improved due to the high electronic conductivity of rGO without carbon deposition.