

Improvement of SOFC anode using Fe-Ni Bimetallic Catalyst for Dry Methane Fuel

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Fe-Ni bimetallic catalyst and gadolinia doped ceria (GDC) has been investigated for a solid oxide fuel cell (SOFC) anode catalyst running on dry methane fuel. The Fe-Ni bimetallic catalyst is prepared by the conventional solid-state reaction. The catalytic activity of nickel can be improved by addition of iron, additionally it is effective for reducing carbon deposition and increasing the power density. In temperature-programmed measurements, Fe-Ni/GDC anode catalyst showed enhanced catalytic activity for methane decomposition and carbon monoxide oxidation. So, we are fabricated using Fe-Ni/GDC as an anode catalyst. The cell fabricated by using Fe-Ni catalyst showed a power density of 0.34 W/cm² at 650°C, when dry methane was used as a fuel. Compared with the single cell prepared without Fe, the anode stability was greatly improved so that Fe-Ni/GDC cell operated for 50 hrs without any degradation while Ni/GDC cell stopped operating below 20 hrs because of carbon deposition.