Short Communication

Study of a Fuel Electrode-Supported Solid Oxide Electrolysis Cell Prepared by Aqueous Co-Tape Casting

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High temperature solid oxide electrolysis cells (SOECs) have the potential to efficiently and economically produce hydrogen fuels. In this paper, large area fuel electrode-supported half cells with $\text{Zr}_{0.92}\text{Y}_{0.08}\text{O}_{2-\delta}$ (YSZ) electrolyte and Ni/YSZ fuel electrode were fabricated by aqueous-based co-tape casting in conjunction with co-sintering, and the air electrode with $\text{La}_{0.6}\text{Sr}_{0.4}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_{3+\delta}/\text{Ce}_{0.9}\text{Gd}_{0.1}\text{O}_{2+\delta}$ (LSCF/CGO) was fabricated by screen printing. In solid oxide fuel cell (SOFC) mode, the maximum power density is 447 mW cm^{-2} at 800°C with humidified H_2 as the fuel and air as the oxidant. In solid oxide electrolysis cell (SOEC) mode, the hydrogen production rate of button cell is $222.2 \text{ ml h}^{-1} \text{ cm}^{-2}$ under an electrolysis voltage of 1.3 V with 70 vol.% steam.

Keywords: Aqueous Tape Casting; Fuel Electrode-Supported; Solid Oxide Electrolysis Cells (SOECs)

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