Short Communication

A Novel Cobalt-free $\text{La}_{0.6}\text{Sr}_{0.4}\text{Fe}_{0.9}\text{Nb}_{0.1}\text{O}_3$ Cathode for Medium Temperature Solid Oxide Fuel Cells

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A novel cobalt-free $\text{La}_{0.6}\text{Sr}_{0.4}\text{Fe}_{0.9}\text{Nb}_{0.1}\text{O}_3$ (LSFNb) cathode material was synthesized by a solid-state reaction. And $\text{BaCe}_{0.7}\text{Zr}_{0.2}\text{Sm}_{0.1}\text{O}_{3-\alpha}$ (BCZSm) electrolyte was prepared by a sol-gel method. Transmission Electron Microscopy (TEM) and Thermal Gravimetry Analysis-Differential Scanning Calorimetry (TGA-DSC) were used to determine the size and the first sintering temperature of BCZSm, respectively. The structures of cathode, electrolyte and anode were analyzed via X-ray Diffraction (XRD). A thin film fuel cell of LSFNb / BCZSm / NiO-BCZSm was assembled and reached the highest power densities of $109 \text{ mW}\cdot\text{cm}^{-2}$ and $182.6 \text{ mW}\cdot\text{cm}^{-2}$ at 700°C and 800°C , respectively.

Keywords: Electrolyte; Fuel cell; X-ray diffraction; Solid state reaction

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