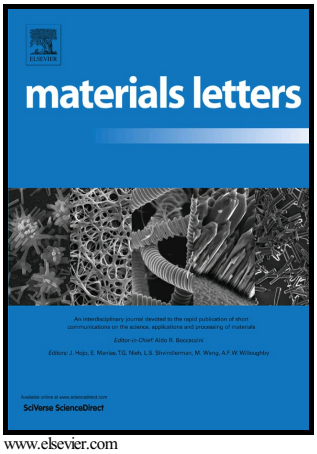

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Fabrication and characterization of $BaZr_{0.1}Ce_{0.7}Y_{0.2}O_{3-\delta}$ based anode supported solid oxide fuel cells by tape casting combined with spray coating

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Abstract

Anode-supported proton-conducting solid oxide fuel cells (SOFC) based on $BaZr_{0.1}Ce_{0.7}Y_{0.2}O_{3-\delta}$ (BZCY) electrolytes were fabricated using tape casting combined with spray coating technique. Dense BZCY electrolyte membranes were achieved when the co-sintering temperature was as low as 1300 °C, and a good adherence of anode to electrolyte membrane was obtained when the co-sintering temperature was up to 1350 °C. Meanwhile, perovskite oxide $La_{0.6}Ba_{0.4}Fe_{0.8}Ni_{0.2}O_{3-\delta}$ (LBFN) was synthesized and the LBFN-BZCY composite material was employed as a novel cobalt-free cathode, the single cell with a 17-μm-thick BZCY electrolyte generated a maximum power density of 232 mW cm^{-2} at 650 °C.

Keywords: Ceramics; Solid oxide fuel cell; Tape casting; Spray-coating; Sintering

1. Introduction

Acceptor-doped $BaCeO_3$ compounds have been studied as electrolytes for intermediate-temperature