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Short Communication

Electrical Properties of a Solid Electrolyte Based on In_2O_3-doped $CaZrO_3$ Prepared by High-pressure Sintering

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The present work provides a simple and effective route for the production of high quality $CaZr_{0.9}In_{0.1}O_{3-\delta}$ (CZI) at relatively low temperature by using high-pressure sintering method. A comparison of structure and conductivity between pressureless sintered CZI (PL-CZI) and high-pressure sintered CZI (HP-CZI) ceramics was carried out using X-ray diffraction as well as scanning electron microscope and AC impedance spectroscopy. In addition, the electrochemical response and sealing performance of the CZI ceramics in high-pressure hydrothermal fluids were tested in a self-designed autoclave. The introduction of pressure during sintering endowed the CZI ceramic with high conductivity, excellent mechanical performance and favorable corrosion resistance; these traits make the HP-CZI ceramic an ideal electrolyte material for hydrogen sensors in high-pressure hydrothermal systems.

Keywords: High-pressure sintering; Proton conductor; $CaZrO_3$; Ceramic; Electrical properties

FULL TEXT