Effects of ZnO Sintering Additive on the Sintering Behavior and Conductivity of YSZ Solid Electrolyte

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The effects of ZnO sintering additive on the sintering behavior and electrochemical properties of YSZ-based solid electrolyte were investigated. With the addition of 3 mol% ZnO, the linear shrinkages of YSZ at 1200 °C increased from 7.1% to 15%, and the relative density at 1200°C increased from 82% to 94.6%. XRD confirmed that a small amount of Zn can be incorporated into the fluorite lattice, and EDX result showed that ZnO mainly distributed at the grain boundary. ZnO modified YSZ had denser structure and fewer pores than YSZ. The increased densification of YSZ by ZnO addition can significantly increase the grain and total conductivities. Compared with YSZ, the total conductivity of 2 mol% ZnO modified YSZ increased from 0.013 to 0.021 S·cm⁻¹ at 800 °C.

Keywords: ZnO modified YSZ; Sintering property; Electrochemical property; Solid oxide electrolyte

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