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**Investigation of the electrochemical property of solid oxide fuel cells with sputtered
yttria-stabilized zirconia electrolyte**

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Abstract

Yttria-stabilized zirconia (YSZ) is the most commonly used electrolyte material for solid oxide fuel cells. The use of relatively inexpensive metal components would require a trade-off in the lowering of the operating temperature below 800 °C. However, the reduced temperature results in an increased resistivity of YSZ. This can be overcome by reducing the electrolyte thickness using thin film techniques. In this study, the preparation of a thin film of YSZ via the sputter deposition technique was reported. YSZ electrolyte films were deposited on anode substrates at 650/750 °C. The gas permeability test indicated a gas-tight electrolyte with a gas leak rate $< 6.36 \times 10^{-7} \text{ lcm}^{-2}\text{psi}^{-1}\text{sec}^{-1}$. The measured open circuit voltage was 1.1 V, while the maximum power density was 515 mWcm^{-2} .

Keywords: yttria-stabilized zirconia, solid oxide fuel cell, sputter deposition, power density

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