

Enhancing the Performance by Adding 100 ppm CuO to 8 mol % Yttria-stabilized Zirconia Electrolyte in Solid Oxide Fuel Cell

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Solid oxide fuel cells (SOFCs) produce electricity directly from oxidizing fuel with an electrochemical conversion. Since 8 mol % yttria-stabilized zirconia (8YSZ) has been considered the most conventional material for SOFC electrolyte which is improved performance by changing dopants or adding a trace of metal oxide. like CuO which promotes a densification of the YSZ electrolyte by acting as a sintering aid and increases the amount of the oxygen vacancy in the YSZ electrolyte. The ionic conductivities are about  $0.0173 \text{ Scm}^{-1}$  and  $0.0196 \text{ Scm}^{-1}$  in pristine and CuO (100 ppm)-YSZ electrolyte, respectively. The cell performance is about  $0.5103 \text{ Wcm}^{-2}$  at  $800 \text{ }^\circ\text{C}$ , which is about 1.5 times higher than the cell based on the pure YSZ electrolyte. The gadolinium-doped ceria (GDC)/8YSZ bilayer cell test also shows similar improvement to the single YSZ cell tests.