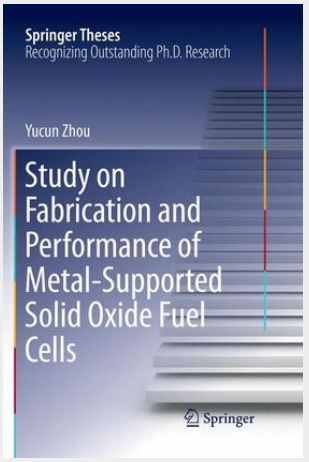
Zhou

Study on Fabrication and Performance of Metal-Supported Solid Oxide Fuel Cells



This book highlights the development of novel metal-supported solid oxide fuel cells (MS-SOFCs). It describes the metal-supported solid oxide fuel cells (MS-SOFCs) that consist of a microporous stainless steel support, nanoporous electrode composites and a thin ceramic electrolyte using the “tape casting-sintering-infiltrating” method. Further, it investigates the reaction kinetics of the fuel cells’ electrodes, structure–performance relationship and degradation mechanism. By optimizing the electrode materials, preparation process for the fuel cells, and nano-micro structure of the electrode, the resulting MS-SOFCs demonstrated (1) great output power densities at low temperatures, e.g., 1.02 W cm-2 at 600°C, when operating in humidified hydrogen fuels and air oxidants; (2) excellent long-term stability, e.g., a degradation rate of 1.3% kh-1 when measured at 650°C and 0.9 A cm-2 for 1500 h. The design presented offers a promising pathway for the development of low-cost, high power-density and long-term-stable SOFCs for energy conversion.

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