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Applications to Thin Film Processing to Solid Oxide Fuel Cells

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Solid Oxide Fuel Cells (SOFCs) have been gaining academic/industrial attention due to the unique high efficiency and minimized pollution emission. SOFCs are an electrochemical system composed of dissimilar materials which operates at relatively high temperatures ranging from 800 to 1000°C. The cell performance is critically dependent on the inherent properties and integration processing of the constituents, a cathode, an electrolyte, an anode, and an interconnect in addition to the sealing materials. In particular, the gas transport, ion transport, and by-product removal also affect the cell performance, in terms of open cell voltages, and cell powers. In particular, the polarization of cathode materials is one of the main sources which affects the overall function in SOFCs. Up to now, there have been studies on the materials design and microstructure design of the component materials. The current work reports the effect of thin film processing on cathode polarization in solid oxide fuel cells. The polarization issues are discussed in terms of dc- and ac-based electrical characterizations. The potential of thin film processing to the applicability to SOFCs is discussed.

Keywords: Solid Oxide Fuel Cells, SOFCs, Thin film, Cathode polarization, Electrical characterization