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ACCEPTED MANUSCRIPT

In-situ Diagnosis and Assessment of Longitudinal Current Variation by Electrode-Segmentation Method in Anode-Supported Microtubular Solid Oxide Fuel Cells

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Abstract

Electrochemical performance of Solid Oxide Fuel Cells (SOFC) is highly dependent on the spatial distribution of the reactant and product species. The structure degradation processes are also associated with the spatial quantities. In fact, spatially measured current variations provide profound information about the local processes. Due to the geometry of microtubular SOFCs (mt-SOFC), notable current variations can develop along the cells and cause temperature variations. By applying the electrode-segmentation method, the longitudinal current variation is thus experimentally investigated in an anode-supported mt-SOFC for various cell voltage and fuel flow rates. As a result, a remarkable current variation is shown among the segments for various flow rates. The current of the downstream segment rapidly decreases with the declining cell voltage implying the fuel

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