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Article

Electrochemically Active Thickness of Solid Oxide Fuel Cell Electrodes: Effectiveness Model Prediction

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Abstract

The threeÃƒÂ¢Ã‚Â€Ã‚Â•phase boundaries (TPBs) in the electrodes of solid oxide fuel cells (SOFCs) have different activity because of the distributed nature of the electrochemical reactions. The electrochemically active thickness (EAT) is a good measure to evaluate the extension of the active reaction zone into the electrode and the effective utilization of TPBs. In this study, an electrochemical reaction/charge conduction problem is formulated based on the ButlerÃƒÂ¢Ã‚Â€Ã‚Â“Volmer reaction kinetics and then numerically solved to determine the EATs for the active electrode layers of SOFCs with various microstructural, dimensional, and property parameters. Thus, the EAT data and correlations presented in this study are expected to provide useful information for designing efficient electrodes of SOFCs.

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