Two-dimensional computation fluid dynamics for Solid Oxide Fuel Cells with fully developed laminar flow

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This work presents two-dimensional (2D) computational fluid dynamics (CFDs) electrochemical model for intermediate temperature solid oxide fuel cells (IT-SOFCs). The model was simulated by the commercial CFD code FLUENT to estimate mass, momentum, energy, species conservation and transport. The model describes the triple phase boundary (TPB) which electrochemical reactions occur. The distributions of fuel/air composition and temperature through the channels and the electrodes were studied. A parametric study was performed to investigate the fully developed laminar flow at the fuel/air channel with the effect of co- and counter-flow configuration. The model was validated with experimental data from Zhao & Virkar.
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