# Micro-Scale Model for Oxygen Reduction on LSM-YSZ Cathode

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In this study, a detailed reaction mechanism for oxygen reduction on LSM/YSZ is applied to dynamic one-dimensional micro-scale modeling of LSM-YSZ composite cathodes. The model incorporates the effects of cathode microstructural properties on the local transport phenomena and electrochemistry inside the cathode. The reaction mechanism used in the model features two parallel routes for bulk gas oxygen conversion to electrolyte lattice oxygen, namely two-phase boundary (2PB) and three-phase boundary (3PB) pathways. The model predicts field distributions of local thermodynamic values, over-potential, Faradaic current and other parameters relevant to cathode performance. Electrochemical impedance simulations are performed to analyze the contribution of specific mechanistic steps to the overall impedance. A parametric study was performed to assess the sensitivity of the model predictions to select model parameters and cathode micro-structural properties. Simulation results are further compared to experimental findings reported in literature.