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Thermodynamic Stability Mapping and Electrochemical Study of $La_{1-x}Sr_xCo_{0.2}Fe_{0.8}O_{3\pm\delta}$ (x=0.2-0.4) as a Cathode of Solid Oxide Fuel Cells in the Presence of SO_2

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Abstract

Thermodynamic predictions and electrochemical analysis of secondary phase formation in SO_2 containing atmosphere on the surface of $La_{1-x}Sr_xCo_{0.2}Fe_{0.8}O_{3\pm\delta}$ (x=0.2-0.4) electrodes of solid oxide fuel cells have been carried out utilizing the CALculation of Phase Diagram (CALPHAD) approach. Impact of temperature, SO_2 partial pressure, O_2 partial pressure as well as the cathode composition on the formation of secondary phases have been investigated and correlated with the previous investigations in the literature. The results predict that $SrSO_4$, $CoFe_2O_4$, $La_2O_2SO_4$ and $La_2(SO_4)_3$ has the possibility to form on the surface and at the cathode/electrolyte interface as a result of SO_2 existence in the system. It is also investigated that degradation occurs more severe

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