

Abstract Submitted
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Electrochemical modification of Surface valence - Cr precipitates on LSCF surfaces¹ MARTIN FINSTERBUSCH, J.A. SCHAEFER, Physics Dept., Montana State University, Bozeman, MT 59717; Institut fuer Physik, Technical University Ilmenau, 98693 Ilmenau, Germany, B.C. EIGENBRODT, R.A. WALKER, Chemistry Dept., Montana State University, Bozeman, MT 59717, A. LUSSIER, Y.U. IDZERDA, Physics Dept., Montana State University, Bozeman, MT 59717 — Interactions of gaseous Cr contaminants with the perovskite material LSCF ($\text{La}_{0.6}\text{Sr}_{0.4}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_3$) commonly used as cathode for Solid Oxide Fuel Cells (SOFC) were investigated by means of X-ray absorption Spectroscopy (XAS) and Raman Spectroscopy. The setup consisted of a model cell with a GDC ($\text{Gd}_{0.1}\text{Ce}_{0.9}\text{O}_2$) electrolyte pellet with a LSCF cathode on both sides in a Cr containing sample holder. The chemical structure and valency of the precipitate were found to depend on the electrochemical conditions of the surface, particularly on the bias voltage and not the total current density present in the cell. Cr^{6+} spinels were found to form under high bias voltage, while under low bias voltage mostly Cr_2O_3 was formed. The influence of the contact material (Au vs. Ag) and the effect of quenching were investigated by Raman Spectroscopy under operating conditions (800 °C in air). XAS unlike EDS, XRD or XPS is a precise and valuable tool for the direct measurement of the oxidation state of transition metals in compounds if the concentration is low (contamination) and the substrate is porous.

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Martin Finsterbusch

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