# SURFACE SR SEGREGATION BEHAVIORS IN A MODEL THIN FILM PEROVSKITE CATHODE FOR SOLID OXIDE FUEL CELLS

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Surface cation segregation, strontium (Sr) in particular, has been considered as one of crucial barriers to achieving a fast surface oxygen exchange rate of perovskite oxide electrodes for solid oxide fuel cells (SOFCs). However, the major driving force for the segregation phenomenon still remains unknown, and thus it is also unknown how to maximize the cathode performance.

In this work, we fabricated epitaxial thin films of $SrTi_{1-x}Fe_xO_{3-\delta}$ (STF) via pulsed laser deposition (PLD) and quantitatively characterized their microstructures, surface chemical compositions and oxygen exchange rates by a range of analysis tools, in this case HR-TEM, HR-XRD, angle resolved X-ray photoelectron spectroscopy (AR-XPS) and electrical conductivity relaxation (ECR). The use of well-defined epitaxial thin films not only guarantees high precision, reproducibility and reliability of the surface properties, but also enables us to control the degree of misfit strain by varying the choice of the substrate and the target composition. This, in combination with density functional theory (DTF) simulation, enabled to reveal a close relationship between the degree of surface Sr segregation and the misfit strain and thereby to identify the governing factors for the Sr segregation phenomenon.