



# Synthesis and characterization of electrodeposited samaria and samaria-doped ceria thin films

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<https://doi.org/10.1016/j.electacta.2011.02.101>

## Abstract

Samaria ( $\text{Sm}_2\text{O}_3$ ) and samaria-doped ceria (SDC) films are electrochemically deposited on stainless steel in view of a potential use in solid oxide fuel cells. As it is possible to deposit separately pure ceria ( $\text{CeO}_2$ ) and pure samaria ( $\text{Sm}_2\text{O}_3$ ) in similar conditions, SDC films were successfully obtained in one electrochemical conditions set. Thin films have been fabricated at low-temperature ( $30^\circ\text{C}$ ) by applying a cathodic potential of  $-0.8\text{ V/SCE}$ , for 2 h. Structural and morphological properties of electrodeposited films have been studied by X-ray diffraction (XRD), scanning electron microscopy (SEM), techniques and Raman spectroscopy. Special attention has been focused on the Raman spectroscopy study to emphasize the effect of heat treatment and samarium doping. Despite cracks, single SDC phase was obtained crystallizing in a cubic symmetry.