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# Understanding the growth of doped ceria thin films

Sigelinde Van Steenberge[1], Wouter Leroy[1], Diederik Depla[1]

[1]Ghent University, Gent, Belgium

Sigelinde.VanSteenberge@UGent.be

Solid state electrolytes are materials which are electrically conductive due to the presence of mobile ions acting as charge carrier. The charge carrier can be a cation (such as $H^+$, $Li^+$, $Ag^+$) or an anion (such as $F^-$ and $O^{2-}$). This work focuses on doped cerium oxide ($Ce(M)O_2$) which is an oxygen ion conducting fluorite-structured electrolyte and is used in several applications such as Solid Oxide Fuel Cells (SOFC). As its growth process is not understood yet, this complex oxide material is chosen as a model material to investigate the compositional and structural effects when Ce is replaced by another element ($Ce(M)O_2$ with M = Y). Since most of the literature data concerning this kind of material is related to bulk material and thick films, thin films of yttria doped $CeO_2$ are deposited via dual magnetron reactive sputtering. By use of this technique, the elemental composition of the doped thin films can be varied in a flexible way. Modifying the thin film morphology and texture is attained by varying the deposition conditions. X-Ray Photoelectron Spectroscopy (XPS) and Energy Dispersive Spectroscopy (EDS) are employed to determine the elemental composition of the deposited films. The thin film crystallinity is characterized using θ-2θ measurements and pole figures.

**Keywords**
SOFC
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