Noble metals supported on rare earth metal oxides are able to be active catalysts for fuel cells applications [1,2]. In the past decade, cerium oxide CeO\textsubscript{2} has attracted considerable research interest and several studies have shown its potential as a conversion catalyst when combined with Pt, Pd or Au [3,4].

For CeO\textsubscript{2}/Pt system, the ability of ceria to store and transport oxygen, associated with a valence change from Ce\textsuperscript{3+} to Ce\textsuperscript{4+} and the presence of Pt\textsuperscript{2+/4+} species makes this material very promising [5,6].

In this study, we report TEM investigations on ceria and Pt-doped ceria thin films deposited by CVD on different substrates (Figure 1). SEM and STEM experiments reveal different morphology and porosity depending on the substrate. The crystallographic structure of CeO\textsubscript{x} layers has been studied by mean of high resolution TEM and shows the presence of different cerium oxides and carbides. Moreover, EELS experiments were performed to determine the cerium oxidation state throughout the layer, which can be related to the CeM\textsubscript{5}/CeM\textsubscript{4} areas ratio [7].


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Fig. 1: Morphology of crystallized CeOx later deposited by CVD on silicon substrate. The layer exhibits a grain growth with a lot of intergrain porosity.