

## Design of novel nanosized ceria-based composite oxides for catalytic applications

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Ceria ( $\text{CeO}_2$ ) and ceria-based composite oxides are the topic of numerous investigations recently owing to their broad range of applications in catalysis, materials science and fuel cell technology. Ceria is one of the most important components in three-way catalysts (TWC) and fluid-cracking catalysts (FCC). Other significant applications of ceria-based materials include  $\text{deNO}_x$  catalysis, removal of soot from diesel engine exhaust and elimination of volatile organic compounds (VOC) from waste streams. Pure ceria is poorly thermostable and undergoes rapid sintering under high temperature applications thereby losing its crucial oxygen storage capacity (OSC). Replacement of cerium by cations of different size and/or charge modifies the ionic mobility inside the lattice resulting in the formation of defective fluorite structured solid solutions. Such modifications in the defect structure of ceria confer new properties to the catalysts, such as better resistance to sintering and a high catalytic activity for various reactions. Some of these aspects with respect to highly dispersed nanosized ceria-based nanocomposite oxide over various supports will be addressed in this presentation.