# Insight into the structural characterization of pure and Zr-doped hydrothermally synthesized cerium oxide nanoparticles

The hydrothermal synthesis of pure and zirconium (Zr)-doped cerium oxide nanomaterials (with doping concentration of 3% and 5% of Zr) is being presented in this investigation. The structural and morphological characterizations are carried out by means of X-ray diffraction (XRD) and Scanning Electron Microscopy (SEM). XRD analyses exhibit the formation of pure face-centered-cubic (FCC) structure having lattice constant ranging between 5.41385-5.41114 Å. SEM studies divulge random and non-uniform distribution of a few nanometer sized crystallites in all the synthesized materials with minute variations in their sizes. Furthermore, the temperature dependent dc-electrical characterizations in 300-393 K temperature range demonstrate gradual increase in conductivity with increasing temperature depicting semiconductor type behaviour but a small decrease with rising Zr content in the synthesized nanomaterials. The present study reveals that Zr-doped ceria nanoparticles appear to be suitable for applications such as photocatalysis, resistive switching memory etc.