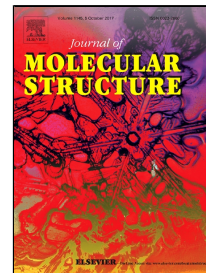


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Zinc-doped cerium oxide nanoparticles: Sol-gel synthesis, characterization, and investigation of their *in vitro* cytotoxicity effects

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Abstract

Zinc-doped cerium oxide nanoparticles (Zn-doped CeO₂-NPs) with Ce_{1-x}Zn_xO₂ composition, where x equals to 0.0, 0.01, 0.03, and 0.05 are synthesized through a green based sol-gel method from nitrate precursors and gelatin at the fixed calcination temperature of 600 °C maintained for 2 h. The powder X-ray diffraction (PXRD) patterns displayed the single-crystalline structure of these particular samples, which seemed to be completely indexed with the cubic fluorite phase. The evolution of crystalline phases in Ce_{1-x}Zn_xO₂ are assured by the observed broadening in PXRD peaks, while the field emission scanning electron microscopy (FE-SEM) images revealed that the spherical-shaped single-crystalline NPs do exist and confirmed the size estimations that were obtained from the Scherrer's equation. A dose dependent toxicity with non-toxic effects of concentrations up to 31.25 µg/mL is illustrated through the *In vitro* cytotoxicity studies regarding Neuro2A cells.

Keywords: Green synthesis; sol-gel; cerium oxide; Zn-doped cerium oxide; nanoparticles; cytotoxicity effect

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