

Cerium oxide nanoparticles: green synthesis and biological applications

ABSTRACT

CeO₂ nanoparticles (NPs) have shown promising approaches as therapeutic agents in biology and medical sciences. The physicochemical properties of CeO₂-NPs, such as size, agglomeration status in liquid, and surface charge, play important roles in the ultimate interactions of the NP with target cells. Recently, CeO₂-NPs have been synthesized through several bio-directed methods applying natural and organic matrices as stabilizing agents in order to prepare biocompatible CeO₂-NPs, thereby solving the challenges regarding safety, and providing the appropriate situation for their effective use in biomedicine. This review discusses the different green strategies for CeO₂-NPs synthesis, their advantages and challenges that are to be overcome. In addition, this review focuses on recent progress in the potential application of CeO₂-NPs in biological and medical fields. Exploiting biocompatible CeO₂-NPs may improve outcomes profoundly with the promise of effective neurodegenerative therapy and multiple applications in nanobiotechnology.

Keyword: Cerium oxide nanoparticles; Green synthesis; Biocompatibility; Surface Ce³⁺; Size; Morphology