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Internal quantum efficiency and energy transfer processes in Ce3+ co-doped ZrO2: Eu3+ nanorods

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Abstract content
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Cerium co-doped ZrO2: Eu3+ nanorods was synthesized by a simple chemical dehydration route and their structural, morphological and optical properties were investigated. Structural studies revealed mixed-phases of monoclinic and tetragonal Bravis lattices. Nanorods of different dimensions were observed on the scanned images. Excitation and absorption spectra revealed the dominance of the Eu3+ - O2- charge transfer states band over the intraconfigurational lines of the activator ion. A broad emission band with center maximum at 465 nm is attributed to both Ce3+ ion and the host band emissions. Electronic transitions in the range 500 nm to 650 nm are assigned to the Eu3+ ion. No significant energy transfer was observed because concentration quenching process dominated the energy transfer process. The internal quantum efficiency decreased with increasing Ce3+ concentration.

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