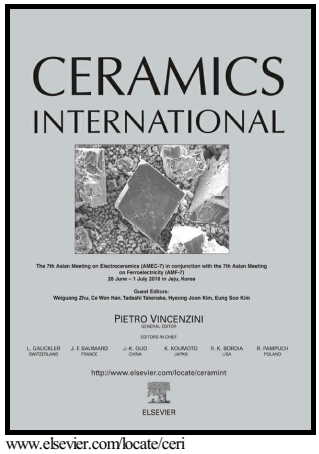

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Upconversion emission of ZrO_2 nanoparticles doped with Erbium (Er^{3+}) and Ytterbium (Yb^{3+}), synthesized by hydrothermal route

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Abstract

This paper reports the luminescent response upconversion of zirconium oxide (ZrO_2) nanoparticles doped with erbium (Er^{3+}) and ytterbium (Yb^{3+}) ions, synthesized by hydrothermal route. X ray diffraction (DRX) showed that the synthesized material presents the face centered cubic (FCC) structure. High resolution transmission electron microscopy (HRTEM) showed the presence of crystals size smaller than 10 nm. The photoluminescent analysis allowed to observe an intense upconversion luminescence emission of the samples doped with both ions Er^{3+} and Yb^{3+}, when these are excited with 910 nm laser source, showing the electronic transitions $^4F_{9/2} \rightarrow {}^4I_{5/2}$; $^2H_{11/2} \rightarrow {}^4I_{5/2}$; $^4S_{3/2} \rightarrow {}^4I_{15/2}$ of Er^{3+}. Two decay times were observed, whose behavior can be associated to the average distance between erbium ions within the nanocrystals.

Keywords: Upconversion, Zirconium oxide, Hydrothermal, Erbium, Ytterbium.

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