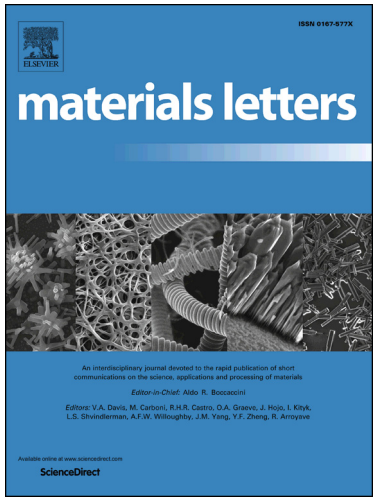

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Abstract:

We prepared the Y_2O_3 nanocrystals doped with Tm^{3+} and Ce^{3+} ions by the sol-gel method. The luminescence lifetimes, excitation and emission spectra have been studied in detail. The Tm^{3+}/Ce^{3+} doped Y_2O_3 nanocrystals can emit strong 813nm infrared with the excitation of 698nm red light. The excitation wavelength at 698nm and emission wavelength at 813nm are located in the weak absorption area of biological tissues, which can enhance the quality of optical imaging.

Keywords: Luminescence materials; Rare earth ions; Optical imaging

1. Introduction

Trivalent lanthanide ions own abundant energy level structures and excellent spectral characters in the visible and infrared wavelength regions[1-10]. Luminescent materials doped with rare earth ions have been applied to optical technology and bio-medicine domains[12-14]. In recent years, optical imaging has been widely studied as a detection method to biological molecules, cells and tissues, which can color code the molecular variability and heterogeneity of diseased tissues in vivo, and be propitious to improve diagnostic accuracy and image-guidance for surgical resection. In order to improve the imaging quality and penetration depth of optical imaging, people have attempted a lot of ways[15-21]. Because the tissue has lower luminescent absorption in the 650-950nm wavelength region, it is interest that both excitation wavelength and emission wavelength of the luminescence probe locate in

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