

Abstract

$\text{Y}_{1.866}\text{Eu}_{0.134}\text{O}_3$ and $\text{Lu}_{1.56}\text{Gd}_{0.41}\text{Eu}_{0.03}\text{O}_3$ single crystals of the cubic rare-earth sesquioxide phase were grown for the first time by a new flux method, in air and at temperatures between 1250 and 1100°C. Magnetic susceptibility measurements performed in the former crystals suggest that a preferential dissolution of Eu^{3+} cations occurs on the C_2 -site. Transmission measurements established the promising optical quality of the samples, especially for $\text{Lu}_{1.56}\text{Gd}_{0.41}\text{Eu}_{0.03}\text{O}_3$ in the red spectral range where most of the scintillation light is emitted. The $\text{Lu}_{1.56}\text{Gd}_{0.41}\text{Eu}_{0.03}\text{O}_3$ single crystal, grown and tested for the first time, is an efficient X-ray scintillator and its characteristics seem promising for X-ray imaging with medium spatial resolution, in terms of light output and low afterglow. Emission and transmission spectra were measured and Eu^{3+} Judd-Ofelt analysis was performed in both crystals