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Reduction of Eu^{3+} to Eu^{2+} in $\alpha\text{-Y}_2\text{Si}_2\text{O}_7$ and $\text{X1-Y}_2\text{SiO}_5$ and their luminescent properties

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Abstract

Due to its bright tunable emission, Eu-doped yttrium silicates are very interesting materials for LED applications. The microparticles of $\alpha\text{-Y}_{1.98}\text{Eu}_{0.02}\text{Si}_2\text{O}_7$ and the low-temperature phase of $\text{Y}_{1.98}\text{Eu}_{0.02}\text{SiO}_5$ (X1) were prepared by sol gel technique. Then, the samples were reduced at high temperatures using pure hydrogen as reduction agent. The materials obtained were characterized by X-Ray diffraction, Scanning Electron Microscopy, Energy Dispersive X-Ray and Photoluminescence spectroscopy. The presence of Eu^{2+} in the materials after the reduction was confirmed by the blue-green band emission and the wide absorption band, observed only in the excitation spectra of the reduced samples. These

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