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Reduction of Eu^{3+} to Eu^{2+} in α-$Y_2Si_2O_7$ and X1-Y_2SiO_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 α-$Y_{1.98}$ $Eu_{0.02}$ Si_2O_7 and the low-temperature phase of $Y_{1.98}$ $Eu_{0.02}$ SiO_5 (*X*1) 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