Effect of Mg^{2+} and Ti^{IV} doping on the luminescence of $Y_2O_2S:Eu^{3+}$.

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The $Y_2O_2S:Eu^{3+},Mg^{2+},Ti^{IV}$ (x_{Eu} = 0.028, x_{Mg} = 0.086, x_{Ti} = 0.03) materials were prepared with the flux fusion method. According to X-ray powder diffraction, the materials had the hexagonal crystal structure. The emission of $Y_2O_2S:Eu^{3+},Mg^{2+},Ti^{IV}$ was centered at 627 nm (λ_{exc} : 250 nm) due to the $^5D_0 \rightarrow {}^7F_2$ transition of Eu^{3+}. The excitation spectra (λ_{em} : 627 nm) showed broad bands at 240 and 320 nm due to the $O^{2-} \rightarrow Eu^{3+}$ and $S^{2-} \rightarrow Eu^{3+}$ charge transfer transitions, respectively. The latter band can also overlap with the $Ti \rightarrow Eu^{3+}$ energy transfer. In the excitation spectra with synchrotron radiation, in addition to the $O^{2-} \rightarrow Eu^{3+}$ and $S^{2-} \rightarrow Eu^{3+}$ charge transfer transitions, excitation over the band gap was observed at 4.8 eV (258 nm). The red persistent luminescence due to the $^5D_0 \rightarrow {}^7F_2$ emission from Eu^{3+} residing in the regular Y^{3+} site of the host was *ca.* 10 min with 1 min fluorescent lamp irradiation. In addition, a very broad band was observed at 600 nm probably due to the Ti^{3+} emission.

Słowa kluczowe

Yttrium oxysulfide, Europium, Persistent luminescence, Synchrotron radiation

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