Nitridated $CaSiO_3$: Eu and $SrSiO_3$: Eu phosphors for LEDs

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Streszczenie

Eu^{2+}-activated single-phase $CaSi(O,N)_3$ and $SrSi(O,N)_3$ oxonitridosilicate phosphors were synthesized by a conventional solid-state reaction method at 1100 °C and 1200 °C. For comparative purposes, their oxide equivalents, $CaSiO_3$ and $SrSiO_3$, doped with Eu^{2+} were obtained using the same synthesis method. The XRD patterns for the obtained phosphors indicate the formation of single-phase oxide and oxynitride phosphors. Energy Dispersive Spectroscopy (EDS) confirmed the incorporation of nitrogen in the phosphor host lattices. The formation of Ca/Sr-N and Si-N bonds can be observed in the FT-IR spectra. The oxonitridosilicate phosphors showed intense emission from Eu^{2+} in the green-red spectral region. The emissions were redshifted compared to their oxide counterparts described in the scientific literature. The thermal stability and quantum yields (QY) of oxonitridosilicate phosphors were significantly improved compared with respective oxide phosphors. This shows the high potential of oxynitrides as phosphors for light-emitting diodes (LEDs).

Słowa kluczowe

CaSi(O,N)3:Eu, SrSi(O,N)3:Eu, Oxonitridosilicate, structure, luminescence, LED

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