Comparison of different $NaGdF_4$:Eu^{3+}synthesis routes and their influence on its structural and luminescent properties.

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Streszczenie

Eu^{3+}:$NaGdF_4$ samples were obtained via co-precipitation in aqueous solution (CP), reversed micelle (RM) method, reaction between solid GdF_3 and NaF solution (SR) as well as a solid-state reaction at high temperatures (SS). The synthesised materials were characterised using X-ray powder diffractometry, TEM microscopy, infrared spectroscopy and TGA analysis. For discussion of optical properties excitation and emission spectra were recorded and emission decay times were measured. The CP and RM methods allow to obtain powders with crystallite size of ~10 nm, which may be smoothly increased to about 1 μm during post-fabrication heat treatment. Differences in structural and especially in optical properties of phosphors prepared by different techniques are emphasised and applicability of wet-chemistry routes for synthesis of fluoride powders is argued.

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