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Structural and luminescent properties of nano-sized $NaGdF_4$: Eu^{3+} synthesised by wet-chemistry route.

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Streszczenie

Hexagonal Eu^{3+}:$NaGdF_4$ fluoride with average grains size of 20 nm was obtained from solution by a co-precipitation method. Morphology of the obtained powder was examined by XRD and TEM methods. Absence of the Eu^{3+}-O^{2-} charge-transfer band, expected in excitation spectrum at ~260 nm indicates, that oxygen ions are not incorporated into a fluoride lattice. As-received fluoride contains considerable amounts of the water molecules, adsorbed at the surface of the material, which may be relatively easily removed by heating the powder at 300 °C. Thermal treatment at 650 °C is sufficient for removing of the OH^- groups built into fluoride lattice. Influence of method of synthesis as well as oxygen, water molecules and OH^- groups content on optical properties of the obtained phosphors is investigated and discussed by comparison with optical properties of the Eu^{3+}:$NaGdF_4$ fluoride synthesised by a solid-state reaction.

Słowa kluczowe

Phosphors, Nanostructures, Morphology, Precipitation, Luminescence, NaGdF4

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