Nano/micro -powders of Nd^{3+}-doped YPO_4 and $LuPO_4$ under structural and spectroscopic studies. An abnormal temporal behavior of f-f photoluminescence.

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Streszczenie

We report a detailed analysis of both structural characterization and high-resolution spectroscopic properties of Nd^{3+}-doped YPO_4 and $LuPO_4$ in the form of nano/micro -powders. $LuPO_4$, like YPO_4 crystalizes in a zircon-type tetragonal system. Nd^{3+} ion in substitution of Lu^{3+} or Y^{3+} cations occupies the main symmetry site D_{2d} and the presence of additional components in the spectra may indicate the presence of Nd^{3+} clusters, first Nd^{3+} pairs. For both types of compounds (with Lu^{3+} and Y^{3+} ion in the host lattice) the $^4F_{3/2}$ excited level decay times recorded at 77 K have shown an abnormal temporal behavior of Nd^{3+} photoluminescence. This phenomenon is observed both for nano and micro-powdered samples.

Słowa kluczowe

Tetragonal orthophosphates, Nd3+ dopant, Nano/micro-powders, NIR emitting optical materials, Abnormal temporal behavior of photoluminescence

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