Nd^{3+} dopant influence on the structural and spectroscopic properties of microcrystalline $La_2Mo_2O_9$ molybdate.

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In this paper we report the detailed analysis of both structural characterization by XRD, DSC, Raman, SEM techniques and high resolution spectroscopic properties of microcrystalline Nd^{3+}-doped $La_2Mo_2O_9$ (LAMOX) dilanthanum dimolybdate obtained by the conventional solid state reaction. Basing on the analysis of a series of compounds with a wide range of Nd^{3+} ion concentration we discovered that the amount of Nd^{3+} dopant substituting La^{3+} ions affects significantly on structural and spectroscopic properties. Pure Nd^{3+}-doped phases with monoclinic structure (α-form, the space group $P2_1$) were observed for the concentration of optically active ion up to 15%. When the concentration of Nd^{3+} ions is higher a cubic structure (β-form, the space group $P2_13$) starts to form. However, up to concentration of 50 mol% of the Nd^{3+} ion a mixture of the monoclinic and cubic phases has been observed. Pure cubic phase was obtained when the Nd^{3+} contents had reached 50 mol%. The spectroscopic analysis has shown that the Nd^{3+}-doped monoclinic phase might be useful for application in the future as phosphors and ultra-short pulses (pico, femto) laser materials. The cubic phase could be useful to fabricate transparent ceramics and might be an important challenge for laser applications.

Słowa kluczowe

Nd3+ dopants, La2Mo2O9 molybdate, Monoclinic and cubic systems, Spectroscopic properties, Near-infrared luminescence

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