

Nd³⁺ dopant influence on the structural and spectroscopic properties of microcrystalline La₂Mo₂O₉ 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 Nd³⁺-doped La₂Mo₂O₉ (LAMO_X) dilanthanum dimolybdate obtained by the conventional solid state reaction. Basing on the analysis of a series of compounds with a wide range of Nd³⁺ ion concentration we discovered that the amount of Nd³⁺ dopant substituting La³⁺ ions affects significantly on structural and spectroscopic properties. Pure Nd³⁺-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 Nd³⁺ 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 Nd³⁺ ion a mixture of the monoclinic and cubic phases has been observed. Pure cubic phase was obtained when the Nd³⁺ contents had reached 50 mol%. The spectroscopic analysis has shown that the Nd³⁺-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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