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**Growth, structural and spectroscopic properties of Yb<sup>3+</sup>-doped Li<sub>0.75</sub>Gd<sub>0.75</sub>Ba<sub>0.5</sub>(MoO<sub>4</sub>)<sub>2</sub> crystals**

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The optical bands of lanthanides in tetragonal double tungstate and molybdate single crystals exhibit large bandwidths associated to local structural disorder. Tunable and ultrashort (fs) laser operations have been shown in Yb-doped crystals of this class [1,2]. In the search for crystalline laser hosts with improved properties we study a ternary Li-Gd-Ba double molybdate.

10 mol% Yb-doped Li<sub>0.75</sub>Gd<sub>0.75</sub>Ba<sub>0.5</sub>(MoO<sub>4</sub>)<sub>2</sub> crystals were grown in air by the TSSG method using a Li<sub>2</sub>Mo<sub>2</sub>O<sub>7</sub> flux. The 1:6 mol solute/flux mixture was melted in a Pt crucible. The growth cooling interval was 933-922 K at a 0.08 K/h rate.

The crystal structure has been determined by single crystal XRD analysis as isostructural to other monoclinic ternary molybdates with space group C2/c (Z = 4) [3]. However, concerning the cationic distribution the structure refinement shows important differences with respect to previous studies.

5K optical absorption and photoluminescence allowed to determine the Yb<sup>3+</sup> energy level sequence, E(F<sub>7/2</sub>) = 0, 223, 353, 433 cm<sup>-1</sup>, and E(F<sub>5/2</sub>) = 10248, 10413 and 10687 cm<sup>-1</sup>. The optical transitions show inhomogeneous broadening featuring local disordered environments around Yb<sup>3+</sup>. Absorption and emission cross sections are determined at 300 K and the potential application as laser is evaluated.

[1] C. Cascales et al. Phys. Rev. B, 17 (2006) 174114.

[2] M. Rico et al. J. Opt. Soc. Am. B, 23 (2006) 1083

[3] R.F. Klevtsova et al. Zhur. Struk. Khimii, 33 (1992) 126.