Growth and characterization of single crystal fibers of Nd^{3+}:$LiLa(MoO_4)_2$ by the micro-pulling-down method.

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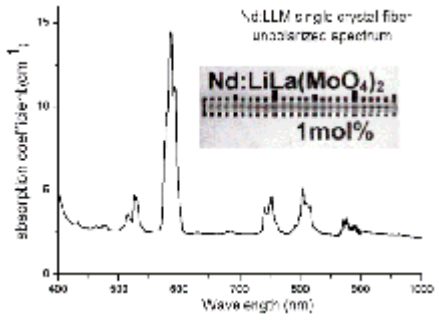
Alkali rare earth double molybdates are favorable hosts for developing tunable solid state lasers because their crystalline fields allow broader absorption and emission bands. In other hand, fibers are proved as a low cost and reduced dimension alternative for solid state laser devices [1-2]. In this scope, $Nd:LiLa(MoO_2)_4$ (Nd:LLM) crystal is suggested as a potential efficient laser crystal for diode laser pumping [3]. In this work, we investigate the growth process by the micro-pulling-down method of pure and Nd^{3+}:LLM single crystal fibers. Starting materials of several doping compositions and pulling rates of 0.04 – 0.08 mm/min were employed to the fiber growth. The fibers were yellowish and lilac transparent for LLM and Nd:LLM respectively, 30 mm long and homogeneous in diameter of 0.8 and 1.2 mm. Changes in the melting evaporation occur with addition of neodymium. Although evaporation was high in the pure material, in the doped one such phenomenon was not significant. LLM fibers present some inclusions and facets due to the instability of the liquid zone (meniscus) and the excess of MoO_3 in the melt. The average meniscus height of 200 μm leads to the growth of macroscopic defects free fibers. The Nd:LLW fibers show the characteristic optical absorption bands of Nd^{3+}. LLM and Nd:LLM fibers were monophased and crystallize at the tetragonal system with $I4_1/a$ symmetry.



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