

Growth and characterization of BaY₂F₈:Nd:Dy

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In this work, we studied the growth and the optical properties of Nd³⁺ and Dy³⁺ co-doped BaY₂F₈ (BaYF:Nd:Dy) single crystals to determine their potential for optical applications. The laser potentiality of fluoride crystals doped with trivalent rare earth ions (TR³⁺) has already been demonstrated in many matrixes. In particular, because of its low phonon energy, the BaYF crystal is as an attractive host for effective upconversion processes. Single crystals (bulk and fibers) of pure and TR³⁺-doped BaYF were growth by Zone Melting (ZM) and Micro-Pulling-Down (M-PD) methods. The samples prepared by ZM were growth with rate of 4mm/h, under HF atmosphere, in Pt crucibles. The nominal concentration were C_{Nd}=0,8% and C_{Dy} =1%. Slices of 5 – 8 mm for optical spectroscopy were cut perpendicular to the zone movement. The experiments of pure and doped BaYF fiber growth by M-PD showed a strong influence of the atmosphere on the fiber quality. Experiments were performed under pure Argon (Ar) and a mixed Ar plus tetrafluorocarbon (CF₄) atmosphere. Different crucible shapes were tested too. The influence of the growth parameters and optical characterization of the obtained samples will be discussed.