

Growth and characterization of rare earth doped YLF single fibers

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Recent research on single crystal fiber growth has opened new possibilities for laser applications. The light guiding properties of the fibers properly combined with the conversion properties of laser media may result in the development of new compact diode pumped solid-state systems^[1]. In this work rare earth-doped yttrium-lithium tetrafluoride (YLF) fibres were grown using the micro-pulling-down (μ -PD) technique in resistive mode^[2]. Favored by stability of the meniscus, stable growth regimes can be obtained by μ -PD, ensuing fibres of constant diameter and constant dopant distribution. The starting material was synthesized from a mixture of YF_3 and LiF melted under HF flow and purified by zone melting technique. The initial growth charge was always LiF enriched (5 mol%) and to ensure a good optical transparency in the near infrared region (no moisture contamination) a previous vacuum treatment was always performed in addition to the use of a reactive atmosphere composed of Ar (75%) and CF_4 (25%). The effect of the growth atmosphere and doping on the quality of Er:YLF and Er:Nd:YLF single crystal fibers will be discussed. The obtained fibers were characterized by optical spectroscopy and microscopy. (This work was supported by CNPq).

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[2] A. M. E. Santo, B. M. Epelbaum, S. P. Morato, N. D. Vieira Jr., S. L. Baldochi, Growth and characterization of LiF single crystal fibers by the micro-pulling-down. J. Crystal Growth, 270, 121-3, 2004.