CHARACTERIZATION OF LILA(XO4)2:ND3+ (X = MO, W) MICROCRYSTALS GROWN BY THE MICRO-PULLING DOWN TECHNIQUE

JAIR RICARDO DEMORAES[1]; SONIA LICIA BALDOCHI[1].

1.INSTITUTO DE PESQUISAS ENERGÉTICAS E NUCLEARES - IPEN, SÃO PAULO - SP - BRASIL.

Palavras-chave: FIBRAS MONOCRISTALINAS;FLUORESCENCIA R-x;TERRAS RARAS

Resumo:

The growth and characterization of $LiLa(XO_4)_2:Nd^{3+}$ (X = Mo, W) microcrystals as single crystal fibers was studied for future laser development. Materials with two or more constituent cations, that present superposed X-ray fluorescence energies, cannot be accurately quantified by the traditional energy dispersion X-ray spectroscopy (EDX). This is the case of the energy lines of Nd^{+3} and La^{+3} ions on the Nd:LLX host. For this reason, the real concentration along the Nd:LLX single crystal fibers were evaluated by a synchrotron X-ray fluorescence microprobe system (μ-XRF). The undoped and Nd-doped LLX crystalline fibers were grown by the micro-pulling-down technique (μ-PD). Nd:LLX powders were obtained by the appropriate mixtures of both $LiLa(XO_4)_2$ (LLX) and $LiNd(XO_4)_2$ (LNX). The content of neodymium is described by the following relation: $LiLa_{1-x}Nd_x(XO_4)_2$ with x = 0.01, 0.02, 0.05 and 0.10. The μ-XRF experiments were performed in an X-ray Fluorescence beam line at LNLS, Campinas, Brazil, using a monochromatic beam for sample´s excitation. In this case, the selective energy excitation of Nd absorption edge reduces the overlapping of the fluorescence lines of La and Nd, allowing a more accurate determination of the incorporated dopant. The collected data analyzed with the PyMca software available at LNLS. The results showed that the LLM host supports the doping by Nd ions without strong segregation and its distribution is quite homogeneous along the fiber length.