

Synthesis and characterization of Nd:LiLa(WO₄)₂ microsized particles for photonic applications

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The control of the crystallite and the cluster sizes in the microsized crystals are crucial for the enhancement of the laser action in powder hosts to obtain solid state random lasers. Crystallites out of the range between 50 and 200 nm and crystallite clusters smaller than 1 μm are undesirable for this application since these characteristics increase the laser threshold [1-2]. Morphology also plays an important role on the powders luminescence however; very few works regard this influence on the laser action [3]. Recently, the luminescence investigation of Eu³⁺-activated nano and microsized crystals of double tungstates that belong to the family ARE(WO₄)₂, where A is an alkali metal and RE the rare earth ions was widely reported in the literature [4]. These studies reveal that these Eu-doped hosts are very promising for the development of red emitting materials for W-LED application due to the strong luminescence and also to the chemical stability compared to Y₂O₂S, usual compound employed in this device. Moreover, there is still no investigation about double tungstates microsized particles for solid state random laser. In this work one propose to obtain samples of undoped and Nd³⁺-doped LiLa(WO₄)₂ by the modified Pechini sol-gel method. The calcination time and temperature influence on the morphology, crystallite and cluster sizes was analyzed. Samples were characterized by DTA, SEM, XRD and light scattering.

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