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Structural studies in single and poly crystals of Yb(1-x)Tb(x)MnO3 manganites

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Rare-earth manganites, RMnO₃, have been object of intense theoretical and experimental research; mainly focused on the exotic properties observed in these materials. Ferroelectricity, ferromagnetism, superconductivity and multiferroicity are some of the properties observed in RMnO₃, been the multiferroicity the most important phenomena of the parent manganites YbMnO₃ and TbMnO₃ [1]. The focus of the present work is to find correlations between structural characteristics and the physical properties of some type of ferroic materials. Polycrystalline perovskites of Yb_{1-x}Tb_xMnO₃ (x=0, 0.25, 0.50, 0.75 and 1) were synthesized using solid-state method. Single crystals of the same compounds are to be produced by LHPG (Laser Heated Pedestal Growth) [2]. In the present work structural studies at room temperature will be reported. Samples with x=0 and 1 crystallizes in the P63cm and Pnma space groups, respectively. In the case of mixed compounds attention was paid to the study of the phase coexistence as well as to the site occupancy shared between rare-earth Tb and Yb [3]. Magnetic studies using powder samples were not conclusive due to the high anisotropy observed in these materials. Single crystals are under production in order to allow magnetic directional studies and consequently to search for results that can be correlated to the crystal structure. Improvement has to be made in the rare-earth site occupancy model to better associate magnetic results with atomic positions and individual magnetic moments.

[1] T. Kimura, T. Goto, H. Shintani, et al., *Nature*, 2003, 426, 55-58., [2] M.R.B. Andreeta, A.C. Hernandez, S.L. Cuffini, et al., *J. Crystal Growth*, 1999, 200, 621-624., [3] M.E. Bolívar, A de M. Moreira, N.L. Speziali, *J. Appl. Cryst.*, 2013, 46, 644-648.

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