EFFECT OF DOPANT CONCENTRATION ON THE PHOTOLUMINESCENT PROPERTIES OF $SrWO_4:Eu^{3+}$

J.M. Carvalho Jr.[1], L.C.V. Rodrigues[1], M.C.F.C. Felinto[2], H.F. Brito[1],
[1] *Universidade de São Paulo, Instituto de Química, São Paulo-SP, Brazil*
[2] *IPEN, CQMA, São Paulo-SP, Brazil*
e-mail: jose.miranda.carvalho@usp.br

Inorganic materials doped with trivalent rare earth ions (R^{3+}) have been extensively applied as luminescent phosphors because exhibit high emission intensities. Alkaline earth tungstates have shown intrinsic luminescence mainly attributed to the ligand to metal charge transfer (LMCT) band, which the energy can be transferred to emitting centers as the R^{3+} ions. In this work, the $SrWO_4$ matrix doped with different concentrations of Eu^{3+} were synthesized by a soft chemistry method using a simple precipitation without any thermal treatment. The X-ray powder diffraction patterns (Fig. 1) indicated that the main component is the Scheelite phase with high crystallinity. Besides, the crystallite size data of the samples, calculated by using the Scherrer formula were *ca.* 30 nm. The SEM micrographs were obtained, showing high homogeneous profile for the different concentrations. The excitation spectra showed both the O→W LMCT band centered at 290 nm and the $4f^6$ intraconfigurational transitions of Eu^{3+} ion. However, the emission spectra of the Eu^{3+}(5 %) ion doped in $SrWO_4$ matrix showed the only the $^5D_0 \rightarrow {}^7F_{0\text{-}4}$ transitions of europium ion with similar spectral profiles (Fig. 2) under excitations at 290 (LMCT band) and 393 nm ($^7F_0 \rightarrow {}^5L_6$). The $^5D_0 \rightarrow {}^7F_2$ transition presents highest emission intensity. Furthermore the absence of LMCT broad emission band of $SrWO_4$ indicating the efficient energy transfer from the matrix to the Eu^{3+} emitting center. The $SrWO_4:Eu^{3+}$ nanocrystalline phosphors were efficiently prepared by a simple method with high crystallinity. This luminescent material showed an efficient energy transfer from the LMCT band to the Eu^{3+} ion, suggesting that these doped systems are promising red emitting nanophosphors.

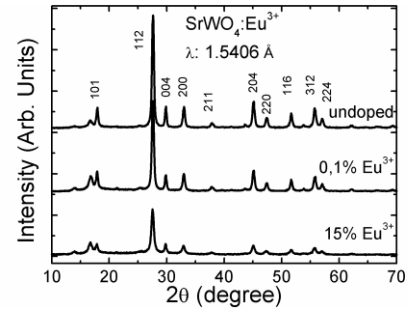

Fig. 1. X-ray powder diffraction patterns of $SrWO_4:Eu^{3+}$.

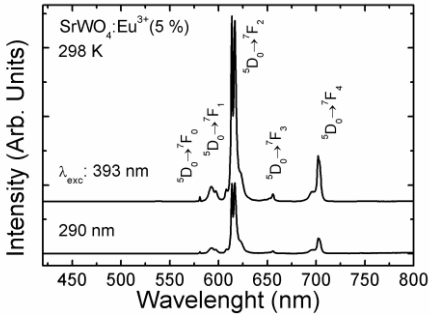

Fig. 2. Emission spectra of $SrWO_4:Eu^{3+}$(5%) under excitation at 290 and 393 nm, at 298K.