FP 01

THE EFFECT OF NEODYMIUM IN THE SPECTROSCOPIC PROPERTIES OF HEAVY METAL OXIDES GLASSES

L. R. P. Kassab[a], L. C. Courrol[b], N. U. Wetter[b], L. Gomes[b], and C. M. S.P.Mendes[a]

a. *FATEC-SP, Praça Coronel Fernando Prestes 30, SP, CEP 01124-060,* b. *Centro de Lasers e Aplicações, IPEN-CNEN, SP*

Spectroscopic properties of a new family of neodymium doped heavy metal oxides (PbO-Ga_2O_3–Bi_2O_3) glasses, produced at the Laboratory of Glasses and Datation of FATEC-SP are presented. Recently the literature reported the use of Er^{3+}, Tm^{3+}, Dy^{3+} and Pr^{3+} in this host. In these cases the highest emission cross-section is of $0.7x10^{-20}cm^2$ (for Er^{3+} at 2730nm and for Pr^{3+} at 1300nm). The highest fluorescence lifetime measured is 0.9ms for the upper level of Er^{3+}, $^4I_{11/2}$, followed by Tm^{3+} (1.035ms for the $^3F_4$ level); Dy^{3+} and Pr^{3+} present low fluorescence lifetimes given, respectively by 0.005ms ($^6H_{9/2}$ level) and 0.053ms ($^1G_4$ level). The contribution of our work is to study, for the first time laser transitions for wavelengths lower than 1300nm in glasses in the system (PbO-Ga_2O_3–Bi_2O_3). In this work we show the results of emission cross-section, fluorescence lifetime, Judd-Ofelt parameters, transition probability, branching ratios related to the samples produced with different concentrations of Nd^{3+} (0.1 up to 2mol%). These glasses are dark red, have high refractive index (2.5) and transmission cutoff in the far infrared (8μm). The highest fluorescence lifetime, 0.130ms occurs for 0.5mol% and it decreases to 0.06ms for 2mol%. At 1066nm the peak emission cross-section is of about $10^{-20}cm^2$ and the branching ratio is 0.5 for 1mol%.