Abstract Submitted
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Extended X-ray Absorption Fine Structure (EXAFS) Analysis of Novel High Laser Media[1] ARANWELA HEMANTHA, G.K. MARASINGHE, University of North Dakota, CARLO SEGRE, Illinois Institute of Technology, RICHARD BROW, Missouri University of Science and Technology — Rare earth-doped phosphate glasses are useful for a variety of optical and optoelectronic applications including high energy/high power ($\sim 10^{15}$ watt) Lasers. Binary $(R_2O_3)_x(P_2O_5)_{1-x}$ glasses can be prepared in the compositional range $0 \leq x \leq \sim 0.30$. Atomic-scale structure, especially the coordination environment of R^{3+} ions, play a major role in determining optical/physical characteristics. We have investigated the R^{3+} local environment of Praseodymium and Neodymium ultraphosphate and meta phosphate(REMP) glasses using extended X-ray absorption fine structure technique. For both Nd and Pr phosphate glasses, nearest neighbor (oxygen) coordination decreases with increasing RE concentration. For the first oxygen shell the RE-O distance ranges between 2.38-2.40 Å and 2.39-2.46 Å for Nd and Pr respectively. The second co-ordination shell around the RE ions consists of phosphorus ions, with RE-P distance about 3.4-3.5 Å and co-ordination numbers ranging from 1.5 to 3. There exists an Oxygen shell (third shell) about 4.1 Å from RE ion for both Nd and Pr phosphate glasses.

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