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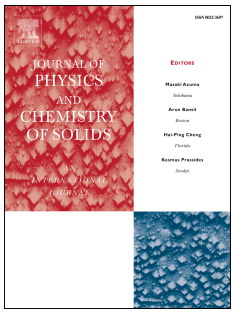

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Synthesis, Characterization and Thermal Decomposition of Tetramethylammonium Rare Earth Double Selenates

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Abstract

A series of double selenates, as $(CH_3)_4NLn(SeO_4)_2{\cdot}4H_2O$ (Ln = Rare earth ion like La, Pr, Nd, Sm, Gd, Tb, Dy) was crystallized from mixed solution and characterized in detail for their structure, vibrational and optical properties as well as thermal stabilities. The crystal structure of the praseodymium compound was obtained by single crystal X-ray diffraction (XRD) and revealed a monoclinic (*C*2/*c*) lattice with chains formed by PrO_8 and SeO_4 units. The chains with compositions $[Pr(SeO_4)_4(H_2O)_4]^{-}$ are stacked in three dimensions and the $(CH_3)_4N^+$ ions located in between them provide charge neutrality to the structure. The characterization of other compounds were carried out from powder XRD data and revealed that they all are isostructural to Pr-compound. All the functional groups were identified by Raman and IR spectroscopic studies. Solid state ^{77}Se NMR revealed noticeable changes in