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Investigation of Solid State Synthesis and Characterizations of Novel Sodium Rare-Earth Oxyphosphates

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Abstract: A new orthorhombic phase of Na_2LaOPO_4 (sodium lanthanum oxyphosphate), and novel Na_2NdOPO_4 (sodium neodymium oxyphosphate), Na_2SmOPO_4 (sodium samarium oxyphosphate) were synthesized by solid state reactions of Na_2CO_3, $NH_4H_2PO_4$, and Ln_2O_3 (Ln = La, Nd, and Sm). The unit cell dimensions were calculated using their X-ray powder diffraction data, which were a = 13.60(1), b = 12.71(1), and c = 6.96(1) Å, a = 13.466(5), b = 12.547(6), and c = 6.932(5) Å, and a = 13.54(1), b = 12.577(8), and c = 7.047(5) Å, respectively, and the probable space group was Pmm2. Using the same procedure orthorhombic Na_2DyOPO_4 (sodium dysprosium oxyphosphate), Na_2HoOPO_4 (sodium holmium oxyphosphate), Na_2ErOPO_4 (sodium erbium oxyphosphate), and Na_2YbOPO_4 (sodium ytterbium oxyphosphate) were also prepared for the first time in this work. The IR data of the compounds agreed with the values given in the literature. The Raman data and SEM micrographs of the synthesized compounds are given for the first time in this report.

Key Words: Oxyphosphates, Rare-earths, Sodium Rare Earth Oxyphosphate, Raman, powder XRD, SEM

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