

Abstract Submitted
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Synthesis, optical and thermal characterization of NaPO₃ glass.¹

C MOHANTY, R CHBEIR, A WELTON, P BOOLCHAND, Univ of Cincinnati — We have synthesized the stoichiometric bulk glass by reacting equimolar amounts of Na₂CO₃ and P₂O₅, and handling the anhydrous starting materials and reacted product in a dry ambient environment. The bulk glass displays a T_g of 306(2)C and an enthalpy of relaxation of 0.26 cal/gm using MDSC. In a previous report a T_g = 287C was obtained¹ using DSC. The glass was crystallized and characterized by XRD and revealed a powder pattern that is in excellent agreement with the known structure (CSD 174021). Raman scattering of the glass revealed prominent modes of symmetric vibration of the PO₄ tetrahedra bearing P-O_{br} and -P-O_{ter} bonds near 684 cm⁻¹ and 1162 cm⁻¹ respectively. The integrated intensity ratio R of the 1162 cm⁻¹/684 cm⁻¹ modes is close to 1.0(1) in the crystal but increases to 1.4(1) in the glass reflecting the finite length of the P-O-P chains in the latter. The highest frequency mode is a weak feature near 1268 cm⁻¹, which coincides with the TO response in IR reflectivity of the glass, suggesting that it represents the TO mode of the NaPO₃ glass.

¹J.J. Hudgens et al. JNCS 223, 21 (1998).
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