Abstract Submitted
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Raman scattering and modulated-DSC experiments on Potassium Germanate glasses* N. WANG, D. NOVITA, P. BOOLCHAND, University of Cincinnati — We have synthesized titled glasses in the $0 < x < 0.16$ range by traditional melt-quenching, and have examined them in Raman scattering and modulated-DSC (MDSC) experiments. Raman lineshapes observed in the present work are quite similar to those reported by Henderson and Wang [1]. Preliminary MDSC experiments reveal glass transition temperatures, $T_g(x)$, starting from a value of 570 $^\circ$ C at $x = 0$, to decrease to 508 $^\circ$ C near $x = 0.06$, and to increase thereafter almost linearly to 552 $^\circ$ C as x increases to 0.15. On the other hand, the non-reversing enthalpy associated with T_g provides evidence of a global minimum in the $0.08 < x < 0.10$ range, the reversibility window[2]. These results are consistent with glasses at $x < 0.08$ as *Stressed-Rigid*, those at $x > 0.10$ as *Floppy,* while those in the reversibility window as representing the *Intermediate Phase*[2]. The space filling nature of the *Intermediate Phase* is, independently, corroborated by trends in molar volumes which show a broad global minimum in the 9-11% range. Identification of the three elastic phases provides a physical basis to understand the origin of the Germanate anomaly, and the electrical conductivity threshold when glasses become mechanically floppy. *Supported by NSF grant DMR 04-56472. [1] G.S.Henderson and H.M.Wang, Eur. J. Mineral. 14, 733 (2002). [2] P.Boolchand, G.Lucovsky, J.C. Phillips and M.F.Thorpe, Phil. Mag 85,3823 (2005).

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