Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Molecular structure of $(AgPO3)_{1-x}$ $(AgI)_x$ glasses D. NOVITA, U. VEMPATI, P. BOOLCHAND, Univ. of Cincinnati, Cincinnati, OH 45221-0030 —
Melt-quenched $AgPO_3$ glasses were synthesized by dry (Ag_3PO_4 + P_2O_5, prep. 1) and wet ($NH_4H_2PO_4$ + $AgNO_3$, prep. 2) routes. Glass transitions were examined in MDSC at a scan rate of 3^oC/min. Prep. 1 samples display *bimodal* glass transition temperatures, with $T_g^{low} = 220^oC$ and $T_g^{high} = 238^oC$ and with the T_g^{low} endotherm higher in strength than the T_g^{high} one. In contrast, prep. 2 samples show a single $T_g = 203^oC$ that is significantly lower in temperature. These results are consistent with the notion that prep. 2 probably yields samples with bonded water while prep 1 gives pure $AgPO_3$ glasses that are intrinsically *phase separated*. The nature of the two phases in the latter is less obvious at present, but we note that upon alloying AgI, the additive selectively bonds in the T_g^{low} phase at low x (<0.20) with T_g^{low} steadily decreasing, and with the T_g^{high} phase remaining largely unaffected. At higher x (>0.20) a major structural reorganization occurs, and we observe the opening of a *reversibility window* in the $0.22 < x < 0.37$ range. As in the chalcogenides, we identify the *window* with the intermediate phase with glasses at $x < 0.20$ stressed-rigid, while those at $x > 0.37$ as floppy. A percolation threshold for electrical conduction occurs[1] near $x \sim 0.3$ and falls in the reversibility window as expected.

1. M. Mangion and G.P. Johari, Phys. Rev. B36, 8845 (1987)
Supported by NSF grant DMR 04-56472

Punit Boolchand

Date submitted: 20 Mar 2013 Electronic form version 1.4