Abstract Submitted
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Ion-conduction and rigidity/flexibility of glasses[1] D.I. NOVITA, P. BOOLCHAND, University of Cincinnati, M. MALKI, University of Orleans, M. MICOULAUT, University of Paris — The $(AgI)_x(AgPO_3)_{1-x}$ solid electrolyte glass system has been examined extensively although a consensus on the increase of electrical conductivity with x data has been elusive. Here we show that the variability of the data is likely due to water contamination. Our work is on specifically prepared *dry* samples which display glass transition temperatures $T_g(x)$ that are at least 50 $^\circ$ to 100 $^\circ$ C higher than those reported hitherto. In Raman scattering the frequency of the P-O_t bonds in PO_4 tetrahedra of long chains is found to systematically red-shift with increasing x, and to display thresholds near x= $x_c(1)$ =0.095(3)(stress-transition) and x =$x_c(2)$ = 0.379(5)(rigidity transition). Calorimetric measurements show a reversibility window in the $0.09 < x < 0.38$ range. Room temperature electrical conductivity, $\sigma(x)$, increases with x to display thresholds near $x_c(1)$ and $x_c(2)$, and a logarithmic increase at x> $x_c(2)$ with a power-law $\mu = 1.78(10)$ that is in good agreement with theoretical predictions[1]. Properties of flexibility and rigidity of backbones commonplace in covalent systems[2] is a concept that extends to solid electrolyte glasses as well.

[1]Richard Zallen, Physics of Amorphous Solids
[2] P. Boolchand et al. Phil. Mag 85, 3823 (2005)

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