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Glass structure and electrical conductivity in $(As_2S_{3\ 1-x}\ (Ag_2S)_x$[1]
C. HOLBROOK, P. CHEN, D. NOVITA, P. BOOLCHAND, University of Cincinnati — We have synthesized titled glasses in the $0 < x < 0.16$ range, and have examined them in modulated DSC experiments. The starting materials, As_2S_3 and Ag_2S lumps, were reacted in evacuated fused quartz tubings, and glasses synthesized by water-quench of homogenized melts. Thermal measurements used a TA instruments model 2920 operated at 3 $^\circ$C/min scan rate and 1 $^\circ$C/100s modulation rate. Preliminary results reveal a single glass transition in the $0 < x < 0.05$ range, which steadily decrease from a value of 210 $^\circ$C at x = 0 to 182 $^\circ$ C near x = 0.05. In contrast, bimodal glass transitions are observed at $x > 0.09$, with one $T_g(1)$ near 167 $^\circ$C and the second, $T_g(2)$ near 186 $^\circ$C, and with the endotherm associated with $T_g(1)$ steadily increasing with x. Non-reversing enthalpies associated with T_gs are found to steadily decrease in the $0 < x < 0.09$ range, to nearly vanish in the $0.10 < x < 0.12$ range and to increase thereafter ($x > 0.12$).These findings suggest that glasses at low x (< 0.09) are Stressed- rigid, those at $x > 0.12$ Floppy while those in between in the Intermediate phase[1]. The present results correlate well with earlier[2] electrical conductivity results in suggesting the possibility of an elastic origin to the conductivity thresholds in solid electrolyte glasses. 1. P. Boolchand, D.Georgiev and B. Goodman, J.Opto & Adm. Mater. 3, 703 (2001). 2. E.A. Kazakova and Z.U.Borisova, Fiz. Khim.Stekla **6**, 424(1980).

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