

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Glass structure and electrical conductivity in  $(\text{As}_2\text{S}_3)_{1-x}(\text{Ag}_2\text{S})_x$** <sup>1</sup>

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,  $\text{As}_2\text{S}_3$  and  $\text{Ag}_2\text{S}$  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  $3^\circ\text{C}/\text{min}$  scan rate and  $1^\circ\text{C}/100\text{s}$  modulation rate. Preliminary results reveal a single glass transition in the  $0 < x < 0.05$  range, which steadily decrease from a value of  $210^\circ\text{C}$  at  $x = 0$  to  $182^\circ\text{C}$  near  $x = 0.05$ . In contrast, bimodal glass transitions are observed at  $x > 0.09$ , with one  $T_g(1)$  near  $167^\circ\text{C}$  and the second,  $T_g(2)$  near  $186^\circ\text{C}$ , and with the endotherm associated with  $T_g(1)$  steadily increasing with  $x$ . Non-reversing enthalpies associated with  $T_g$ s 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<sup>1</sup>. The present results correlate well with earlier<sup>2</sup> 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).

<sup>1</sup>Supported by NSF grant DMR 04-56472.

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Date submitted: 05 Jan 2006

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