

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Long Term Aging of  $\text{As}_x\text{Se}_{1-x}$  glasses and the Intermediate Phase<sup>1</sup>**

PING CHEN, JACOB WACHTMAN, P. BOOLCHAND, University of Cincinnati  
— The reversibility window in  $\text{As}_x\text{Se}_{1-x}$  glasses was reported<sup>2</sup> 8 years ago to reside in the  $28\% < x < 37\%$  range. We have re-examined those samples in m-DSC and Raman scattering. Both the 8 year old hermetically sealed samples in Al holders (set A) and samples from the same batch preparation but stored in plastic vials (set B) at laboratory ambient environment were studied. The reversibility window in samples of set A, after 8 years of aging, is found to be intact. In set B, analysis of the  $T_g$  endotherm becomes difficult because of a precursor exotherm that appears in the  $32\% < x < 60\%$  range, and steadily increases with  $x$ . In addition, in both set of samples, one observes a sub  $T_g$  endotherm upon aging in the  $90\text{ }^\circ\text{C} < T < 120\text{ }^\circ\text{C}$  range. These m-DSC results supported by Raman scattering suggest that the exotherm is due to light induced nanocrystallization (nc) of  $\text{As}_4\text{Se}_4$  fragments (an extrinsic effect), while the sub- $T_g$  feature is due to nc fragments of trigonal Se formed upon long term aging (an intrinsic effect). These findings will be compared to a recent report.<sup>3</sup>

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

<sup>2</sup>D.G. Georgiev et al. Phys. Rev. B 62, R9228(2000).

<sup>3</sup>R. Golovchak et al. Phys. Rev. B 78, 014202(2008).

Jacob Wachtman  
University of Cincinnati

Date submitted: 18 Nov 2008

Electronic form version 1.4