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**Structural comparison of Ag-Ge-S bulk glasses and thin films**

FEI WANG, MUKUL JAIN, PORTER DUNN, CARTER DE LEO, EE Department, California Polytechnic State University, PUNIT BOOLCHAND, Department of ECECS, University of Cincinnati — Ternary glasses of composition  $(\text{GeS}_3)_{1-x}\text{Ag}_x$  ( $x=0.1$  and  $0.2$ ) are studied in form of bulk and thin films. Bulk glasses are synthesized and examined in Raman scattering and SEM. Raman scattering results of bulk glasses show that with increasing  $x$ , an increasing fraction of the Ag additive enters the base glass as  $\text{Ag}^+$  with  $\text{S}^-$  anions serving to form thiogermanate species with one, two and three non-bridging  $\text{S}^-$  species. SEM measurements of the bulk glass show the material is intrinsically phase separated. White colored islands are observed distributed in a dark base. The EDS measurements show islands are Ag rich and the base is relatively Ag deficient. The Ag rich islands are expected to be mainly glassy phase  $\text{Ag}_2\text{S}$ . Thin films of same compositions are fabricated using thermal evaporation. Films are evaporated following two different procedures to prevent the material from spitting. One method was preheating outgas and the other method was using tungsten mesh wrapped boats. The stoichiometry and molecular structure of films under each procedure are analyzed by Raman scattering and SEM to be compared with bulk glasses.

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