Raman pressure effects and internal stress in network glasses FEI WANG, S. MAMEDOV, P. BOOLCHAND, B. GOODMAN, Univ. of Cincinnati, MEERA CHANDRA SEKHAR, Univ. of Missouri — Intermediate phases are predicted to be unstressed elastic phases of network glasses. The case of binary Ge$_x$Se$_{1-x}$ glasses reveal the intermediate phase to reside in the $0.20 < x < 0.25$ range$^1$. We have now performed$^2$ Raman scattering on Ge$_x$Se$_{1-x}$ glasses under pressure and find a steady increase in the frequency of modes of corner-sharing GeSe$_4$ tetrahedra when the external pressure $P$ exceeds a threshold value $P_c$. The threshold pressure $P_c(x)$ decreases with $x$ to nearly zero for $0.20 < x < 0.25$, then increases up to $x = 1/3$. $P_c$ indicates the presence of local stress at the Raman active units; so its vanishing suggests that these units are part of an isostatically rigid backbone. Isostaticity also accounts for the non-aging behavior of glasses observed in this same composition range$^2$ that is identified with the intermediate phase in this binary glass system.


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