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Slow kinetics of melt homogenization and strong nature of intermediate phase melts in chalcogenides[1] P. BOOLCHAND, K. GUNASEKERA, University of Cincinnati, S. BHOSLE, IM Flash Technologies — The strong-fragile classification of melts is manifested in the T-dependence of viscosity. Strong (fragile) melts possess a T-independent (dependent) activation energy of viscosity leading to an Arrhenian (non-Arrhenian) behavior reflecting the robust (weak) nature of network structure. We have now measured [1] complex C_p of binary Ge_xSe_{100-x} glasses as a function of x, and find that in dry and homogeneous melts, fragility (m(x)) shows a global minimum ($m < 20$) in the Intermediate Phase (IP) compositions ($19.5\% < x < 26\%$) but increases rapidly outside the IP. These findings have a direct bearing on synthesis of non-stoichiometric melt compositions at elevated temperatures in which IP melt compositions serve as a bottleneck [1] to homogenize [2] batches globally. The physical properties of dry and homogeneous glasses differ significantly from their inhomogeneous counterparts, and have led, in general, to differences in results reported by various groups.

[1] K. Gunasekera et al, "Fragility and kinetics of melt homogenization of network glasses"(In preparation).
[2] S. Bhosle et al., Solid. St. Comm. 151, 1851-1855 (2011).

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