Sub-Tg enthalpy relaxation in both metallic and non-metallic glasses far from equilibrium

An invited talk

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Sub-T_g enthalpy relaxation in both metallic and non-metallic glasses far from equilibrium

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Sub-T_g enthalpy relaxation is a general feature of the glass state far from equilibrium. However, the feature of the sub-T_g enthalpy is highly dependent on the type of glass formers, i.e., on the type of chemical bonding in glass. In this talk, we present and discuss the common features and differences in sub-T_g enthalpy relaxation for metallic glasses, chalcogenide glasses and oxide glasses, all of which are subjected to hyperquenching (>10^5 K/s). We also demonstrate and analyze the differences in enthalpy relaxation between mechanically generated glasses and thermally hyperquenched (HQ) glasses. Differential scanning calorimetry, NMR, synchrotron, X-ray and neutron scattering have been used as the main tools for the study of both enthalpy and structural relaxation. We explore the structural response of a hyperquenched glass to sub-T_g annealing. We show that structural heterogeneity is a crucial factor that influences the enthalpy relaxation behavior of both strong and fragile glass formers.

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