

Students' Annual Seminar

Role of alpha and beta relaxations in Collapsing Dynamics of a Polymer Chain in Supercooled Glass-forming Liquid

Mrinmoy Mukherjee

Understanding the effect of glassy dynamics on the stability of bio-macromolecules and investigating the underlying relaxation processes governing degradation processes of these macromolecules are of immense importance in the context of bio-preservation. In this work we have studied the stability of a model polymer chain in a supercooled glass-forming liquid at different amount of supercooling in order to understand how dynamics of supercooled liquids influence the collapse behavior of the polymer. Our systematic computer simulation studies find that apart from long time relaxation processes (alpha relaxation), short time dynamics of the supercooled liquid, known as beta relaxation plays an important role in controlling the stability of the model polymer. This is in agreement with some recent experimental findings. These observations are in stark contrast with the common belief that only long time relaxation processes are the sole player. We find convincing evidence that suggest that one might need to review the vitrification hypothesis which postulates that alpha relaxations control the dynamics of biomolecules and thus beta-relaxation time should be considered for choosing appropriate bio-preservatives. We hope that our results will lead to understand the primary factors in protein stabilization in the context of bio-preservation.

Thursday, Mar 1st 2018

04:30 PM (Tea/Coffee at 03:30 PM)

Seminar Hall, TIFR-H