

MM 35: Invited Talk: Champion

Time: Thursday 9:30–10:00

Location: SCH A 251

Topical Talk MM 35.1 Thu 9:30 SCH A 251
Configuration entropy and sample size effect on glass transition temperature — ●YANNICK CHAMPION — Univ. Grenoble Alpes, CNRS, Grenoble-INP, SIMaP, 38000 Grenoble, France.

Amorphous materials show an intriguing transition at room temperature between localized and homogeneous deformation. This effect is observed for sample sizes in the micron range for silica glass, tens to hundreds of nm for metallic glasses and less than 20 nm for polymers. It is interpreted as a dependence of the glass transition temperature (T_g) with the sample size. Besides, this has been observed for polymer films and described by an empirical law proposed by Keddie and

collaborators (Keddie et al, Europhys. Lett 1994). A demonstration of this law is proposed from a statistical physics approach and using the potential energy landscape (PEL) description. The work is performed on a Mg-based metallic glass. A configuration entropy is derived from the size distribution of local areas in the PEL favorable to rearrangement. These zones are probed by nano-indentation and assumed to be related to the serrations observed in the deformation curves. The size of the serrations follows a Poisson distribution, indicating that their formation is a rare event. In addition to understanding the effect of size on T_g , the analysis allows the identification of statistical parameters describing the glass structure.