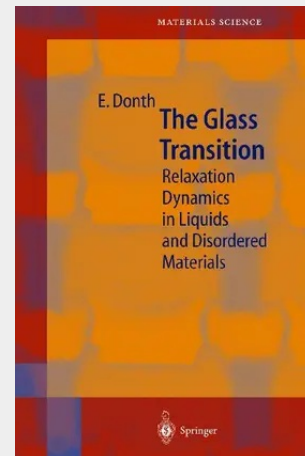


The Glass Transition

Relaxation Dynamics in Liquids and Disordered Materials

The glass transition is well known to glass makers or from the common experience of drying a used chewing gum. A liquid melt or a rubber becomes a solid glass when its temperature is lowered or a solvent is extracted without crystallization. There are also dynamic effects. The viscosity of a liquid is small at high temperatures but increases dramatically as cooling proceeds down to the glass temperature T_g . The increase is continuous and amounts to about fifteen orders of magnitude! The technical importance of the glass transition cannot be overestimated. A few examples will be presented in the Introduction. Most practical knowledge of the glass transition needed for glass or plastic technologies and applications is now readily available. Where then is the problem? In the last few years, glass transition research has enormously intensified. We now have several hundred papers a year in expensive, top scientific journals. In a 1995 Science magazine ranking, the glass transition belongs to the six major physical quests, along with broken charges, physical input for low-dimensional geometry, measurement philosophy in quantum mechanics, coherent X-ray radiation for materials research, and applications of superconductivity. On the other hand, interested people outside the glass transition community have difficulty seeing exactly what the glass transition problems are. In addition, even insiders split into groups over which question could be the most important for slow dynamics in cold liquids.

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