The fragility of glassforming liquids: thermal vs athermal systems, and kinetic vs thermodynamic origins.
C. Austen Angell
Dept. of Chemistry and Biochemistry, Arizona State University, Tempe AZ 85287

Abstract.
Formerly a problem for technologists, and discussed using a different language, the fragility of liquids has more recently become a theoretical challenge, as (i) experiments have revealed an increasingly rich collection of interrelated structural and phenomenological details, and (ii) computer simulation methods have made possible the visualization of events at the atomic level at least for short time processes ($\tau_\alpha < 10^{-6}$ s). We highlight relations between normal pressure fragility (both kinetic and thermodynamic) and the alternative isothermal or athermal ("volume") fragility that is relevant to many hard particle modeling studies (and colloidal fluid experiments). For the common ambient pressure problem, where particles attract except at short range, we consider the special features that can arise with (i) ramp repulsion and metallic glassformers (ii) tetrahedral liquids, and (iii) systems with electronic transitions, and then seek a common ingredient underlying the many and different explanations of fragility. In this effort we need to recognize the problems in conception and quantitation of what constitutes fragile liquid behavior.