

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Delayed Collapse of Colloidal Gels JUAN-JOSE LIETOR-SANTOS, CHANJOONG KIM, ALBERTO FERNANDEZ-NIEVES, DAVID A. WEITZ, SEAS, Harvard University — We study the behavior of colloidal gels under gravitational forces using a system of polystyrene beads and non-adsorbing polymer to induce depletion attraction between particles. As the interaction energy or the volume fraction decreases, a delayed collapse regime is observed, where the sedimentation of the gels starts with a slow initial compression followed, after a delay time, by a rapid collapse characterized by the coarsening of the structure. By means of changing the density mismatch between the network and the surrounding solvent, we are able to explore the dependence of the delay time and coarsening behavior with the gravitational stress. The results clearly show that, even though only the weakest gels undergo delayed collapse, the gravitational stress is not the trigger leading to the coarsening of the structure, although it certainly affects the time it takes the gel to completely sediment.

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Date submitted: 27 Nov 2007

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