Local Elasticity and Colloidal Phase Behavior using Microgels

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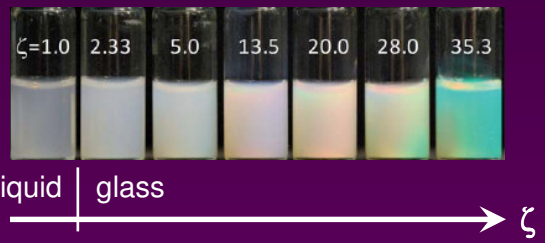
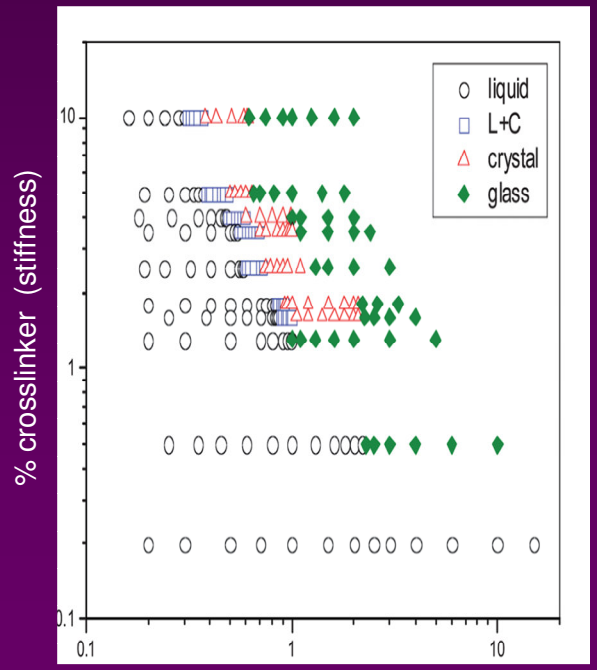
Microgel particles: vinylpyridine, a weak base that ionizes at low pH, and divinylbenzene (DVB), a crosslinker. We work at pH = 3, where the particles have a size of ~1 μm and are maximally swollen, and change the generalized volume fraction, $\zeta = n\, V^{c\sim 0}$, with n the particle number density and $V^{c\sim 0}$ the volume of a particle measured in a dilute suspension.

Stiff Microgels

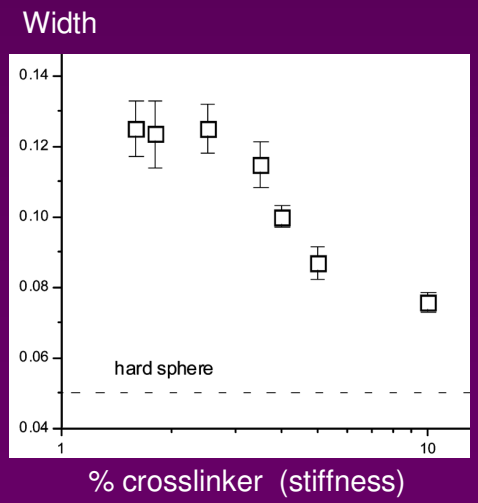
Soft Microgels



Phase behavior as a function of particle stiffness



The width of the phase coexistence region increases with increasing particle softness and it is always larger than the corresponding width of hard sphere suspensions



Stiff microgels: Liquid, crystal and glassy phases.

Softer microgels: Liquid to glass transition.

Even softer microgels: Liquid for all ζ

Internal degrees of freedom (?)