

## **17e Structure and Dynamics of Biphasic Colloidal Suspensions**

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We have studied the structure and dynamics of biphasic colloidal mixtures by quantitative image processing of real time 3-D volumes that were acquired by confocal laser scanning microscopy (CLSM). The biphasic system consists of two distinct populations of colloidal silica particles where the first is a stable fluid and the second a non-equilibrium colloidal gel phase, which coexist under the same conditions. This biphasic behavior is achieved by carefully tailoring the surface chemistry of the phases. Particle cores of the two phases are labeled with different fluorescent dyes to allow their differentiation during CLSM, and the mixtures are suspended in an index-matching solvent to enable 3-D visualization. The structural and dynamical parameters relevant to the mixture's rheology are quantified, and implications of the biphasic nature of the system on these quantities are discussed. These mixtures exhibit unusual rheological properties and may find application in the direct-write assembly of complex 3-D structures from colloidal and nanoparticle inks.