

Complex behavior of
colloidal suspensions under flow

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Colloidal particles show rich phase behavior and accompanying complex rheological behavior. Colloidal particles with attractive forces organize themselves into a space filling network structure that is referred to as colloidal gel. The colloidal gel demonstrates complicated rheological behaviors according to flow condition, such as elastic to viscous transition, visco-plastic flow. At a higher concentration, colloidal glass that is characterized by glassy dynamics are formed. Similar to colloidal gel, the colloidal glass shows complicated rheological behaviors under various flow conditions. In this presentation, the rheology of colloidal suspensions under two representative flow (startup shear, oscillatory shear) will be physically interpreted. The rheological transition of colloidal gel will be discussed in terms of structural change on various length scale. In the case of colloidal glass, complex rheological transition will be correlated to particle dynamics change.