

Competing Interactions in Arrested States of Colloidal Clays

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Using experiments, theory and simulations, we show that the arrested state observed in a colloidal clay at high concentrations is stabilized by screened Coulomb repulsion (Wigner glass). Dilution experiments allow us to distinguish this disconnected state, which melts upon addition of water, from a low-concentration gel state, which does not melt. Theoretical modeling and simulations at high concentrations reproduce the measured small angle x-ray scattering static structure factors and confirm the long-range electrostatic nature of the arrested structure. These findings are attributed to the different time scales controlling the competing attractive and repulsive interactions.