

ABSTRACT

This thesis explores the dispersion stability, microstructure and phase transitions in anisotropic nanodiscs with combination of experiments and theory. Phase behavior and distinct phases of individual and mixed states of nanoclay dispersions is discussed. Nanoclays of different aspect ratio have been used to explore the dynamics. Distinct phase separation, equilibrium fluid and equilibrium gel phases have been observed in nanoclay dispersions with aging. This thesis explores solution behavior, gelation kinetics, aging dynamics and temperature-induced ordering in the individual and mixed states of these discotic colloids. The formation of colloidal gel through different routes has been reported in this thesis. We study the anisotropic ordering dynamics induced by interface, waiting time and temperature in these dispersions. We also study aggregation behavior of nanoplatelets in hydrophobic environment of alcohol solutions.