

Abstract Submitted
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Temperature dependent depletion interaction from PEO and other polymers BEZIA LADERMAN, LANG FENG, STEFANO SACANA, PAUL CHAIKIN, New York University — We have found and tested a depletion mechanism, in which the inter-colloidal attractive interaction can be tuned in an easily accessible temperature range. Usually depletion is considered as a concentration dependent, temperature independent interaction, except when a thermo-sensitive depletent, like Poly-NIPA is used. Our system consists of water, NaCl, micron-size colloids and a polymer depletent. With such solutions colloidal crystals form at room temperature, but as the temperature is increased above a critical point (T_c), we observe the crystals melt and the colloids disperse. The process is thermo-reversible since crystals reform in a few minutes after the temperature is tuned below T_c . We studied the dependence of the critical temperature T_c on factors such as the ionic strength, component/surface chemistry of the particle, type of depletent and additional non-ionic surfactants. Since the gyration radius of the depletent used in this study does not vary significantly with temperature, we argue that a temperature dependent adsorption of polymer depletent on the colloidal surface is responsible for the observed phase transition. Given the generality of the components used, our finding is useful for directed or self-assembly on the colloidal scale.

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