

Shear effects on crystal nucleation in colloidal suspensions

Extensive two-dimensional Langevin Dynamics simulations are used to determine the effect of steady shear flows on the crystal nucleation kinetics of charge stabilized colloids and colloids whose pair-potential possess an attractive shallow well of a few k_{BT} 's (attractive colloids). Results show that in both kind of systems small amounts of shear speeds up the crystallization process and enhances the quality of the growing crystal significantly. Moderate shear rates, on the other hand, destroy the ordering in the system. The very high shear rate regime where a reentering transition to the ordered state could exist is not considered in this work. In addition to the crystal nucleation phenomena, the analysis of the transport properties and the characterization of the steady state regime under shear are performed.

PhysRevE_78_031403