

Effect of the Range of Attractive Interactions on the Metastable Phase Transition and Percolation of Colloidal Dispersions

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In this work, we apply the renormalization-group (RG) theory of White for the vapor-liquid transitions and a modified cell model for crystalline solids to study the effect of the range of attractions on the phase behavior of model colloidal systems represented by the hard-core attractive Yukawa potential and the Asakura and Oosawa potential. Special attention is given to the relation between the range of the attractions and the stability of the colloidal liquid phase and gelation. By comparing our results with the computer simulation data, we clarify some issues in the phase transitions of colloidal suspensions.