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Hydrodynamic effects on aggregation of colloidal particles[1] JEFFREY MORRIS, Levich Institute, City College of New York — The effects of both hydrodynamic interaction and the form of the interparticle potential on the aggregation process for dispersed spherical particles are investigated by computational simulation. The simulation methods of Brownian Dynamics (BD) and Stokesian Dynamics (SD) are applied, over a range of solid volume fraction of $0.04 \leq \phi \leq 0.12$. The interparticle potential is a combination of a generalized Lennard-Jones form and a Yukawa potential, the latter of which describes a screened electrostatic repulsion at longer range. Hydrodynamic interactions were found to significantly reduce the solid fraction required for percolation, with the influence depending upon the form of the potential; the difference in percolation threshold was significant, with $\phi_{c,SD} \doteq 0.06$ and $\phi_{c,BD} \geq 0.08$ a typical difference for moderate repulsion barriers. These results are for O(1000) particles in a cubic unit cell.

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