

Flocculation and percolation in reversible cluster-cluster aggregation

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Résumé en anglais	Off-lattice dynamic Monte-Carlo simulations were done of reversible cluster-cluster aggregation for spheres that form rigid bonds at contact. The equilibrium properties were found to be determined by the life time of encounters between two particles (t_e). t_e is a function not only of the probability to form or break a bond, but also of the elementary step size of the Brownian motion of the particles. In the flocculation regime the fractal dimension of the clusters is $d_f=2.0$ and the size distribution has a power law decay with exponent $\tau=1.5$. At larger values of t_e transient gels are formed. Close to the percolation threshold the clusters have a fractal dimension $d_f=2.7$ and the power law exponent of the size distribution is $\tau=2.1$. The transition between flocculation and percolation occurs at a characteristic weight average aggregation number that decreases with increasing volume fraction.
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