

### Destructuring of weakly aggregating colloidal gels under simple shear flow

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To investigate the microstructural evolution of weakly aggregating colloidal gels under the shear flow, Brownian dynamics simulation method was carried out in this study. Initially, in equilibrium, particles were aggregated to form a colloidal gel structure. Under the shear flow, stress overshoot phenomena were observed. And the microstructural evolution could be divided into three regimes as follows. In the regime1, the stress increased monotonically and the colloidal gel underwent little structural change, in which only a few particles or flocs were detached from the network. In the regime2, the stress reached a maximum after which it started to decrease. During this process, large clusters were decomposed into small flocs. Finally, in the regime3, the stress decreased to a steady region, where slight structural change still keeps on going. To analyze the rupture quantitatively, many analysis methods were used. These include cluster number density and cluster size distribution, which were used to check the characteristics of the network. And other methods, such as fractal dimension, bond number distribution, were also used.