

Gelation kinetics of rod particle suspension in Newtonian fluid under shear flow

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The gelation kinetics of goethite rod particles in a Newtonian solvent under shear flows is investigated. The particles are prepared to have the aspect ratio of about 8.7 with the diameter of about 120nm and the particle interaction is not negligible. To examine the effect of shear history on gelation, tests with a strong preshear followed by a creep test are performed with varying preshear period. The rod particle suspension becomes a gel during the creep test showing the plateau in G' and yield stress. The gelation time during the creep test is dependent on preshear period. Both the plateau in G' and the yield stress are larger when the preshear time is longer. The gelation appears to occur by two steps of the formation of flocs and then the formation of the sample spanning network by the aggregation of the flocs. Gel strength appears to be dependent on floc size which is determined by the imposed shear stress period in the present case of shear induced gelation.