Abstract

In this work, we characterized and studied the rheological behavior of montmorillonite suspensions. Our objective was to establish the link between the structure of these suspensions and their rheological behavior.We have characterized these suspensions using several techniques: X-ray scattering to determine their composition and structure, the light scattering to determine the diffusion coefficient of the clay particles and their size. We also measured their densities and their rheological properties in linear and non-linear viscoelasticity.The rheological measurements show that the bentonite particles are structured to form a fractal network. We have determined experimentally the moduli and yield stresses. Using Piau model, we have derived its fractal dimension (D= 1.74. ± 0.08). The light scattering measurements allowed us to determine the particles size and the characteristic time of diffusion of the clay particles in the suspension. Finally, knowing the structure of our suspensions and characteristic time, we tried to model their viscoelastic behavior G. * (α) using Chambon and Winter model