

Abstract Submitted
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Fracture in Kaolinite clay suspensions¹ SEBASTIEN KOSGODAGAN ACHARIGE, DOUGLAS J. JEROLMACK, PAULO E. ARRATIA, Univ of Pennsylvania — Clay minerals are involved in many natural (landslides, river channels) and industrial processes (ceramics, cosmetics, oil recovery). They are plate shaped charged colloids and exhibit different flow properties than simpler colloids when suspended in a liquid such as thixotropy and shear-banding. kaolinite platelets are non-swelling, meaning that the stacks formed by the platelets do not have water layers, and thus the suspension does not have a sol-gel transition. However, it has been shown that kaolinite suspensions possesses a non-zero yield stress even at low concentrations, indicating that the particles arrange themselves in a structure through attractive interactions. Here, we experimentally investigate the sedimentation of kaolinite suspensions in a Hele-Shaw cell. The sedimentation of these dilute suspensions can display solid behavior like fracture, revealed in cross-polarized light, which is linked to the failure of the weakly-bonded structure (typical yield stress $\sim 10^{-2}$ Pa). By changing the interaction potential of the particles (by sonication or introducing salts), we show through these sedimentation experiments, how the fracture pattern can be avoided.

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