
Fabric of Kaolinite and Illite Floccules

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Abstract: A scanning and high voltage electron microscope study of the fabric of laboratory sedimented moist uncompressed kaolinite and illite floccules reveals an abundance of face-face flake orientation in the porous clay network. Clays were flocculated in the laboratory in both distilled water and slightly saline (1 g/l. NaCl) water using various clay concentrations. Floccules taken from the moist clay mass were prepared for study by freeze-drying and impregnation with polyethylene glycol.

There is little difference in the fabric of kaolinite flocculated in distilled or slightly saline water. The fabric is dominated by a 3-dimensional network of twisted chains of face-face oriented flakes having the appearance of a stair-stepped cardhouse. Illite floccules in distilled water also consist of abundant face-face oriented overlapping flakes. However, in salt water there is a more even mixture of fabrics-edge-to-face flocculation of individual platelets and also stepped clusters of face-to-face oriented flakes, the latter being more abundant.

It is suggested that under the experimental conditions the double layer of each clay particle is compressed resulting in an increase in the importance of van der Waals forces of attraction. As a result flakes approach each other and rotate into a parallel or subparallel position. The resultant dominant fabric is that of a stepped cluster of overlapping flakes.

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