
Optical and Electron Microscopic Investigation of Shear Induced Structures in Lightly Consolidated (Soft) and Heavily Consolidated (Hard) Kaolinite

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Abstract: A review of fabric studies of clays suggests the need for relating those fabric characteristics which are revealed at the two levels of magnification provided by optical and electron microscopy, and a technique to achieve this has been developed and is described within the context of the initial stages of a long term study of the interrelation between fabric and engineering behaviour. Two kaolinitic clays with contrived fabrics were prepared by controlling particle size, moisture content and pH of suspension, and consolidation load and were subjected to shear loading to failure. Resin impregnation techniques which permit the kaolinite to be cut into thin sections for transmission electron microscopy have been optimized with the object of minimizing fabric strain and damage during ultratomy.

The fabrics of the hard and soft ambient material are qualitatively compared by means of electron micrographs and are explained in terms of the preparatory procedures adopted for fabric control. The fabrics of the two types of shear induced structures are also qualitatively compared and explained in terms of the original fabrics and the subsequent shear loading.

Clays and Clay Minerals; March 1971 v. 19; no. 1; p. 31-47; DOI: [10.1346/CCMN.1971.0190104](https://doi.org/10.1346/CCMN.1971.0190104)

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