
Electrical Potential Between Dissimilar Clay Double Layers

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Abstract: A model describing the electric double layers in clay-electrolyte systems containing particles with different surface charge densities was developed and used to calculate the film thickness of water present in a clay paste. The average water film thicknesses ($\sim 18 \text{ \AA}$) calculated by considering the clay to contain 9 groups of particles of different charge densities did not differ from those calculated by assuming one average charge density; provided the minimum potential between particles remained constant. These values, however, were higher than those obtained from gravimetric water determinations by about 30%. The overestimation of the average thickness of the water films by the theoretical model is most likely due to the assumption of a complete parallel arrangement of particles in the paste and the validity of the Gouy theory for double layers on clays.

Key Words: Double layer • Electrolyte • Film thickness • Montmorillonite • Surface charge • Water

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