Water Vapor Isotherms and Heat of Immersion of Na/Ca-Montmorillonite Systems—II: Mixed Systems[1]

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[1] The first paper in the series " I: Homoionic clay " was published in *Clays & Clay Minerals* 23, 193 – 200 (1975).

Abstract: Adsorption isotherms for water vapor, c-spacing and heat of immersion in water of mixed Na/Ca-montmorillonite were measured at 25 ° C at various RH. There was good agreement between the calorimetric data, the heat calculated from the isotherms by use of BET equation, and the calculations from the ion-dipole model. It was concluded that the electrostatic forces between the adsorbed cations and the water molecules are the dominant forces in the hydration of the clay. Thus, at low moisture content, only the adsorbed Ca-ions are hydrated. The heat released when Na-platelets condense to form Ca-packets was measured, and it was suggested that this energy term is the driving force for the demixing phenomena.

Key Words: Adsorption • Calcium • Electrostatic • Hydration • Isotherm • Montmorillonite • Sodium

Clays and Clay Minerals; April 1979 v. 27; no. 2; p. 145-151; DOI: 10.1346/CCMN.1979.0270212

Clay Minerals Society (www.clays.org)