
Study of Some Physicochemical Properties of Pillared Montmorillonites: Acid-Base Potentiometric Titrations and Electrophoretic Measurements

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Abstract: The surface charges and the zeta potential of a Na-montmorillonite (Na-mont) and two pillared montmorillonite (MP1 and MP2) samples with different aluminum contents were determined by potentiometric titrations and electrophoretic measurements. At pH >9 the two pillared montmorillonite samples showed zeta potentials similar to those of Na-mont, but at pH <8, the negative zeta potential shifted to lower negative values as the aluminum content increased. Sample MP1, which had a greater Al content, showed an isoelectric point (IEP) of 5.0– 5.5. Titration curves obtained by acid-base potentiometric titration for sample MP1 showed a well-defined cross-over point at pH = 5.0, whereas this point was not observed for sample MP2 in the pH range studied. The results indicate, in principle, that both techniques can be used to characterize surface charges in this type of material. An attempt was also made to relate the data obtained from electrophoretic mobility and potentiometric titrations.

Key Words: Electrophoretic mobility • Montmorillonite • Pillared clays • Potentiometric titration • Surface charge

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