Abstract Submitted
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The Dynamics of Charging of Muscovite Mica: Measurement and Modeling[1] PAUL J. SIDES, Professor, Carnegie Mellon Univ, DANISH FARUQUI, PhD Student, Carnegie Mellon University, ANDREW J. GELLMAN[2], Professor, Carnegie Mellon Univ — The advent of a new method for measuring the zeta potential of planar surfaces, the rotating disk, allowed the investigation of the charging process of mica after immersion in water. The zeta potential of freshly-cleaved muscovite mica was recorded within seconds of immersion of the sample and in fractions of a second thereafter. The zeta potential of mica in water at pH = 5.6 with no added potassium changed by 40 – 50 mV over approximately a minute. A model of adsorption and desorption of potassium ions and protons captured this behavior and provided a framework for determination of surface reaction rate constants. The charging of mica in alkaline KCl solutions of arbitrary concentration, however, was too fast for observation. The equilibrium zeta potential depended on the logarithm of salt concentration, in agreement with a model based on ion exchange reactions. The average values of the proton adsorption, proton desorption, potassium adsorption, and potassium desorption rate coefficients were 45 liter/s ± 15, 0.0014/s ± 0.0006, 58 liter/s ± 5, and 0.14/s ± 0.03, respectively. Web Page: http://zetaspin.com

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