
Adsorption of Molybdate Anion (MoO_4^{2-}) By Sodium-Saturated Kaolinite

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Abstract: Adsorption of Mo(VI) on 2–0.2- μm size fraction of sodium-saturated kaolinite at $25 \pm 2^\circ \text{C}$ and at a constant pH of 7.00 ± 0.05 was studied. The kaolinite sample was pretreated to remove any surface oxide and hydroxide coatings. The initial concentrations of Mo in solution ranged from 1 to 11 mg/liter in a NaClO_4 background electrolyte at a constant ionic strength of 0.09 ± 0.01 . Calculations of speciation using the GEOCHEM computer program indicated that under experimental conditions Mo(VI) was mainly in the MoO_4^{2-} form. The experimental conditions were also shown to fulfill the requirements for applying the Langmuir equation in interpreting adsorption data. The Langmuir parameter for the adsorption maximum, n^0 and the affinity parameter, $K_{\text{MoO}_4^{2-}\text{-ClO}_4^-}$ were computed to be 3.33×10^{-4} mole/mole of adsorbent and 5.969×10^5 , respectively. The large affinity parameter indicated that the Nasaturated kaolinite surface has a very high affinity for MoO_4^{2-} ions relative to ClO_4^- ions.

Key Words: Adsorption • Electrolyte • Kaolinite • Molybdate ion • Speciation

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