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# Effect of Ion-Pair Formation on Boron Adsorption by Kaolinite

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**Abstract:** Boron adsorption on 2-0.2- $\mu\text{m}$  size fractions of kaolinite at  $25^\circ \pm 2^\circ \text{C}$  at pH values between 6.0 and 10.5 was studied. The kaolinite sample was pretreated to remove any surface oxide and hydroxide coatings. The initial concentrations of boron in solution ranged between 2 and 10 mg/liter with either  $\text{KClO}_4$  or  $\text{Ca}(\text{ClO}_4)_2$  as background electrolyte at constant ionic strength of  $0.09 \pm 0.01$  mole/liter. Boron speciation in equilibrium solutions was calculated by using the chemical equilibrium computer program GEOCHEM. The adsorption of boron on kaolinite in either medium showed similar dependence on pH and initial boron concentrations. Boron adsorption at higher pHs was noticeably higher in  $\text{Ca}(\text{ClO}_4)_2$  medium as compared to  $\text{KClO}_4$  medium. These differences were attributed to the formation and adsorption of  $\text{CaB}(\text{OH}_4)^+$  ion-pair species.

**Key Words:** Adsorption • Boron • Ion pair • Ion speciation • Kaolinite

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