
Sorption of Boron by Hydrous Al-Oxide

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Abstract: Boron sorption by hydrous Al-oxide was studied as a function of concentration, pH, temperature and in the presence of oxalate and phosphate. For comparison sorption of B was also measured with charcoal as adsorbent.

At constant pH a Langmuir type equation was found to fit the results well at pH values below 7.2 where only boric acid molecules are present in solution. B sorption was dependent on pH with maximum sorption at pH 8.5. Oxalate and phosphate ligands form strong bonds to Al and were found to reduce B sorption. Sorption of boric acid molecules decreased with increasing temperature and the isosteric heat of reaction was 13.8 kJ mol^{-1} . These results indicate that there are two mechanisms of sorption on hydrous Al-oxide, physical sorption of boric acid molecules and ligand exchange (chemisorption) of borate, and both mechanisms are favored onto the oxide.

Key Words: Boron • Hydrous Al-oxide • pH

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