

Accessory publication

Copper adsorption on humic acid coated gibbsite: comparison with single sorbent systems

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Humic acid sorption to gibbsite

Batch experiments were carried out with suspensions of 0.5 g L⁻¹ gibbsite in 0.1 M KNO₃, at pH 4, 5, and 6, with initial HA concentrations between 3 and 150 mg L⁻¹. The suspensions were shaken for 24 hours to ensure that they reached equilibrium, centrifuged (Hettich Cengrifuge, EBA21) at 6000 rpm and the concentration of HA in solution was determined by UV-visible spectrophotometry.

The HA adsorption isotherms (Fig. A1) display an initial section with a steep slope, which is evidence of the high affinity of HA for the gibbsite surface, and a pH-dependent saturation, so that the maximum HA adsorption decreases as the pH increases. This effect has already been described in studies of the adsorption of humic substances on different surfaces,^[1–3] and the maximum levels observed at the different pH values are comparable to those found for other mineral oxides.^[2,4]

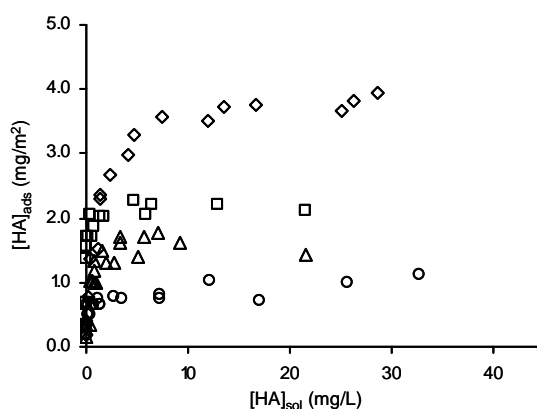


Fig. A1. Adsorption isotherms of HA on gibbsite at different pH values: \diamond , pH = 4; \square , pH = 5; Δ , pH = 5.5; and \circ , pH = 6.

As stated by Weng et al.^[4,5] the pH effect on the adsorption of HA appears to be the combined result of electrostatic interactions, specific interactions between HA functional groups

and mineral oxide surface groups and the co-adsorption and co-desorption of protons at these groups upon HA adsorption. At the pH values of the present study, the electrostatic interactions were expected to be significant, as the HA presents a negative charge at any pH and the gibbsite surface presents a positive charge ($\text{pH} < \text{PZC}$).

References

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