ARSENIC HUMIC ACID REACTIONS

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ABSTRACT

The speciation, distribution, mobility and fate of heavy metals pollutants in aqueous solution are strongly influenced by the presence of natural organic material (NOM). Important characteristics of humic substances are their ability to form water-soluble and water-insoluble complexes with metal ions and sediments or suspended particulates. While organic matter may play an important role in arsenic sorption, quantitative examination of the sorption process involving anions, like those of arsenic, has not received much attention. The objective of this work, therefore, was to investigate the interaction of humic acids with arsenic, in order to understand the role of natural organic molecules on the transport and speciation of arsenic in the aquatic environment. Arsenic (As) humic acid (HL) reactions have been investigated over a range of pH conditions. Hydrolysed species of inorganic As(V) and (III) and an organic from (CH₃)₂AsOOH were utilised. The extent of reaction was found to increase with pH. Equilibrium constants have been derived for use in speciation modelling. The association constants obtained ranged from 4 to 320 mol dm⁻³; the ligand exchange constants ranged from -7.29 to 2.48. It was concluded from these constants, that the reaction between the arsenic species with humic acids could be through ligand exchange mechanism, rather than a simple association process.

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