

## Book reviews

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*Metal Ions in Biological Systems. Vol. 18. Circulation of metals in the environment*; edited by H. Sigel, New York, Marcel Dekker, 1984, 432 pages, \$79.75 or SFr 212. ISBN 0-8247-7226-1.

Eleven chapters by nine different authors make up this book, yet there is evidence of effective editorial control; many of the authors refer to the content of other than their own chapters and very little repetition of material from one author to another occurs. The overriding theme is the interaction of metal species with the natural environment, which in this context means freshwater and sea water.

The overwhelming importance of analytical methods in determining the facts introduces the book and the great difficulties one still faces in measuring and identifying the very low concentrations of possibly important species such as organo-tin compounds are well described. One clear message is need for improved techniques to be developed.

Modelling the speciation of metal ions using computer programmes and published stability constants is covered, together with the difficulties associated with the approach such as worries about the correctness of published data, corrections for changes in temperature and ionic strength, and particularly the presence of extra ligands and surface active materials which can invalidate the conclusions.

There are interesting chapters on the adsorption of metal ions by finely divided oxides, organic matter and soils which can be of great importance in determining the fate of polluting species, particularly in freshwater systems.

Organometallic ions, particularly  $\text{CH}_3\text{Hg}^+$  because of its history, feature several times in this book. The distribution of  $\text{CH}_3\text{Hg}^+$  between  $\text{CH}_3\text{HgCl}$ ,  $\text{CH}_3\text{HgOH}$  and  $\text{CH}_3\text{Hg}^+$  as a function of  $\text{Cl}^-$  concentration and pH is treated as an example of ligands competing for a metal ion, and adsorption isotherms of  $\text{CH}_3\text{Hg}^+$  on clays illustrate differences in the properties of solids. In the chapter on the uptake of metals by organisms there is consideration of the methods available for the analysis of Pb, Sn, As, Sb and Hg alkyls, with hydride generation coupled with selective volatilisation and AAS being identified as generally the most sensitive technique, and there is a review of knowledge of biomethylation by bacteria. Many metals and metalloids are methylated, using vitamin  $\text{B}_{12}$ , as a defence mechanism (the lipid-soluble methyl compounds being readily excreted), but generalisations are dangerous. While the rabbit does protect itself against  $\text{As}^{\text{V}}$  by reducing it to  $\text{As}^{\text{III}}$  and then using *S*-adenosylmethionine to generate the rapidly excreted dimethylarsinic acid, the rat instead immobilises  $\text{As}^{\text{V}}$  by binding it to vicinal thiol groups of a protein.