

Book Review

Metals ions in Biological Systems, Volume 29, Biological Properties of Metal Alkyls

H. Sigel and A. Sigel (eds.), Marcel Dekker, New York, NY, 1993, pp. 444 + xxxvi. \$165.00
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The march of inorganic chemistry into realms originally conceived of as organic has been chronicled admirably in this outstanding series of reviews. The current volume consolidates even more ground by placing the study of organometallic compounds firmly within the orbit of biological systems. What becomes apparent is that organometallic compounds are not just interesting oddities or worrying poisons in biological systems, but are of fundamental biological significance.

The first of the eleven chapters in this fascinating book deals with Global Bioalkylation of the Heavy Elements (J.S. Thayer), which really means of any element heavier than sodium. Biomethylation is almost exclusively an ability of microorganisms, the notable exception being cobalt. This is a valuable survey of the occurrence of this reaction type. Chapter 2 is a guide to Analysis of Organometallic Compounds in the Environment (D. Mennie and P.J. Craig). This is a practical account of sampling, sample preparation, and, finally, results. A discussion of biogeochemical cycles is especially useful as a basis for further literature work. Chapter 3 concerns the Biogeochemistry of Germanium (B.L. Lewis and H.P. Mayer), which forms very stable methyl and dimethyl derivatives in the environment, and appears to be very stable. Little is known about their ultimate fate.

Chapter 4 deals with the Biological Activity of Alkyltin Compounds (Y. Arakawa and O. Wada) and Chapter 5 with the Biological Properties of Alkyl Derivatives of Lead (Y. Yamamura and F. Arai). These subjects have been the focus of intense interest, and the writers have therefore been commendably selective. Chapter 6 is called the Metabolism of Alkyl Ar-

senic and Antimony Compounds (M. Vahter and E. Marafante). Like the two preceding chapters, it does not contain much chemistry, but a lot of basic descriptive information. Chapter 7 discusses the Biological Alkylation of Selenium and Tellurium (U. Karlson and W.T. Frankenberger). It, again, emphasises how little hard data we have concerning the biological chemistry of these elements, and despite the considerable interest they have attracted.

Chapter 8, Making and Breaking the Co-alkyl Bond in B_{12} Derivatives (J.M. Pratt), covers ground well reviewed elsewhere, and Chapter 9, Methane Formation by Methanogenic Bacteria: Redox Chemistry of Coenzyme F430 (B. Jaun), opens up the biological chemistry of nickel. Chapter 10 is a "comment" by the editors on the vast subject of organomercurials. Finally, Chapter 11, Biogenesis and Metabolic Role of Halomethanes in Fungi and Plants (D.B. Harper), is an introduction to a fascinating subject. After all the discussion of the environmental effects of halocarbons, it is surprising to learn that the natural input of CH_3Cl into the environment is $2.5-5.0 \times 10^6$ ton/year, compared to 0.03×10^6 ton generated by man. Even CH_3Br is predominantly generated naturally.

The book does not contain much organometallic chemistry *per se*, except for Chapter 8, but it presents a valuable survey of the formation, detection, destruction, and determination of metal alkyls (defined in the broadest sense) in biological systems and the environment, and will be of great value to a wide range of scientists. The editors deserve our thanks for this splendid production.

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