Metallothioneins. synthesis, structure and properties of metallothioneins, phytochelatins and metal-thiolate complexes
Martin J. Stillman, C. Frank Shaw III and Kazuo T. Suzuki (eds.), VCH Publishers, New York, 1992, pp. 443. DM 218.
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The sixteen chapters in this book are based largely on presentations given at a symposium on The Chemistry of Heavy Metals in Physiologically Important Roles at the 1989 PACIFICHEM conference held in Hawaii. The Editor of the *Journal of Organometallic Chemistry* asked me to review the book even though I contributed to the last chapter of the book (thiolates and metallodrugs).

The book is not in the usual format for conference proceedings. Each chapter has been refereed, edited, and typeset to a common style. This required an enormous amount of work by the editors and accounts for the three-year delay before publication (although there are references up to 1990).

Do not let the title put you off if you are not very "bio". There is quite a lot for the inorganic chemist inside. For example, Dance and co-workers review the structure and dynamics of metal-thiolate and metal-sulfide-thiolate compounds in Chapter 13, including a 22-page compilation of metal thiolate crystal structures. This is followed by a review of the syntheses, structures, NMR and other spectroscopic properties of adamantane-like cages of thiolate, selenolate and tellurolate complexes containing Zn, Cd or Hg, including an extensive appendix of NMR and X-ray data.

Of course the meat of the book is concerned with metallothionein, a protein of only 61 amino acids, 20 of which are cysteines. The protein binds Cd^{2+} or Zn^{2+} ions in two discrete clusters of 4 and 3 metal ions bound only to thiolate S. The conference marked the announcement of the revised X-ray crystal structure (Robbins and Stout, Chapter 3) which now agrees with the NMR structure determined by Wüthrich *et al.* Investigations of the binding of a wide range of "soft" ions including Cu^{+}, Ag^{+}, Au^{+}, Pt^{2+}, and Hg^{2+} are described in the book. It is fair to say that metallothionein is still a protein in search of a function: does it detoxify metals, insert natural metals into apoproteins and enzymes, or something else?

Chapter 11 on metal-sulfide quantum crystallites straddles the inorganic-biological borderline. In response to Cd^{2+} challenge, yeasts synthesize nanometer-sized crystallites composed of cadmium sulphide coated with small cysteine-containing peptides. These luminescent particles resemble semiconductor clusters and can also be synthesized *in vitro*.

The book is well presented with only one notable hiccup (Fig. 6.2 is the wrong figure), and should find a place on library shelves.

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