

Bioorganometallic Chemistry, Topics in Organometallic Chemistry, 17. Edited by Gerard Simonneaux (DR CNRS, Rennes, France). Springer: Berlin, Heidelberg, New York. 2006. x + 222 pp. \$199.00. ISBN 3-540-33047-X.

As far as chemistry monographs go, this book is a good read, and each of the six chapters conveys an excitement that is infectious. It has something for everyone, from the researcher active in bioorganometallic chemistry to those with an interest in this emerging field. Simonneaux presents a good selection of topics that have come to define bioorganometallic chemistry over the years and has selected specialists in the field who have the necessary diligence to summarize each topic authoritatively and concisely while at the same time remaining very accessible. The chapters are didactically written, providing plenty of material for an advanced undergraduate or graduate class without sacrificing the necessary depth needed for an advanced monograph. It is important to note that each of the chapters presents a variety of applications of bioorganometallic compounds. Materials that once were thought to be sensitive and of limited use now find applications as catalysts, sensors, or therapeutic drugs—bioorganometallic chemistry has become part of the chemistry landscape. After two major international conferences devoted to bioorganometallic chemistry and an excellent recent monograph by Jaouen, Simonneaux's monograph could not be more timely.

The book begins with a chapter by Butler and Kräutler on B₁₂-coenzymes, an area that has historically served as the biological example for organometallic chemistry. As you would expect from one of the godfathers of B₁₂ chemistry, Kräutler and co-worker go far beyond presenting a cursory overview of this chemistry found in textbooks and provide an in-depth analysis of the structural and electrochemical properties of B₁₂. They then move on to some studies of reactivity and finally discuss reactivity in enzyme systems.

I was absolutely smitten by the second chapter written by Volbeda and Fontecilla-Camps on nickel–iron–sulfur clusters. I grew up seeing iron–sulfur clusters as interesting examples of inorganic clusters that have a biological role. But right from the start, Fontecilla-Camps and his co-worker take it a step further and make the connection between the biotic and abiotic world, putting a spin on the topic that I find delightful and exciting. Links to ground-breaking work by Wächtershäuser and others on the role of metal sulfides in chemical and early biological evolution are made, and their reactivities are linked to some of the biological [NiFe]-clusters. This is, of course, coupled with a thorough discussion of the structural and mechanistic details of the biological systems.

I was also delighted to see work on metallo-porphyrins, an area so vast that one could easily get lost in the details. Simonneaux and Le Maux, however, expertly capture the spirit

of the work and focus their attention on important topics ranging from the catalytic role of P450, hemoglobin, and myoglobin to some fascinating model chemistry. I was particularly happy to see model chemistry forming such a prominent part of the chapter since it contributed so significantly to the understanding of biological systems and also paved the way for their use in organic synthesis.

When I first leafed through the pages of the book I asked myself what I might expect from a chapter entitled “Organometallic Receptors for Biologically Interesting Molecules”. I was captured very quickly by the fascinating host–guest chemistry described by Severin. The chapter starts with some classic examples of trinuclear half-sandwich complexes and provides some examples of organometallic-biological host–guest type interactions, including the recognition of amino acids, peptides, and some ions, notably Li⁺ and F[−]. Severin adds his own twist to the chapter and describes in detail the indicator displacement assay for the detection of peptide analytes.

It was nice to see a chapter on bioconjugates of ferrocene peptides included in this book, and I thoroughly enjoyed reading it. Moriuchi and Hirao have been active in this area for the past decade and have summarized the achievements of the Hirao group and other research groups in the area with a particular focus on chiral supramolecular helicates. This chapter is well presented with a number of good illustrations that made it easy to follow the line of argument. It also contains a brief discussion of the potential application of these conjugates for the study of electron transfer in peptides and their use to study peptide–protein interactions. Personally, I would have liked to have seen a more in-depth discussion of this area, but at the same time I recognize that this would probably go beyond the aims of this book.

The book closes with a chapter on the medicinal properties of organometallic compounds by Allardyce and Dyson. They do an outstanding job of shattering the myth of organometallic compounds being sensitive and of limited use and provide a range of examples beginning with anticancer compounds, including *cis*-platin and some of the second-generation drugs, antiproliferants, antimalarials, imaging agents, and others. This is an important chapter because it reveals the potential solutions that organometallic chemistry has to offer to discovery-based drug research.

This is a useful book and I am confident that it will achieve what Simonneaux set out to do: to generate excitement about the field and draw new people into this young and rapidly expanding area of research.

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