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Book Review

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Nickel and its surprising impact in nature

Metal Ions in Life Sciences, Volume 2.
Wiley, 2007,
728 pp; price £195.00/€292.50
ISBN 978-0-470-01671-8 (Hardcover)

Since 1973 the Sigels (H.S and A.S.) have edited the 44 volume Metals in Biological Systems series, the last two with R.K.O. Sigel. Now, with a new publisher, the Sigel trio have established a new, broader ranging series, Metal Ions in Life Sciences. This book, *Nickel and its Surprising Impact in Nature*, is Volume 2. It was preceded by *Neurodegenerative Diseases and Metal Ions* and will be followed by Volumes 3 and 4, *The Ubiquitous Roles of Cytochrome P450 Proteins* and *Biomineralization. From Nature to Application*, respectively. Within this volume, on nickel in nature, an international authorship of 46 present 17 chapters that describe: the biogeochemistry of nickel and its environmental role; the interaction of nickel with amino acids, peptides, sugars, nucleobases, phopshates, nucleotides and nucleic acids; the synthetic chemistry that aims to provide structural and functional analogues of the nickel-containing enzyme active sites; a detailed description of the eight classes of nickel-containing enzymes (urease, nickel-iron hydrogenases, methyl-coenzyme M reductase and its nickel corphin coenzyme F_{430}, acetyl coenzyme A synthases and nickel-containing carbon monoxide dehydrogenase, nickel superoxide dismutase, nickel-dependent glyoxalase I enzymes, nickel in acireductone dioxygenase and the nickel-regulated peptidyl prolyl *cis/trans* isomerase SlyD); the chaperoning of nickel; the role of nickel in adaptation of *Helicobacter pylori*; nickel-dependent gene expression; and, finally, the toxicity of nickel and carcinogenesis.

Ironically, it was urease from the Jack Bean that was the first crystallized enzyme obtained by Sumner back in 1926. It was almost a further 50 years, in 1975, before Zerner defined the structure by X-ray crystallography and showed that nickel was a constituent of it. In the last 20 years the bioinorganic chemistry and/or inorganic biochemistry, however it is best defined, of nickel has been and remains an active and exciting field of research and this is reflected in this volume. The breadth and detail of this work is impressive and is presented in an accessible style. With such a work as this, there is always the risk of repetition, but here this is generally not the case. There are, pleasingly, only a few errors. For example, phthalazine is misspelt in several places and an error, that particularly grates with me as the same error occurred throughout my own PhD thesis, is that phosphorus, at least in one place, is misspelt as phosphorous! Further, at least within the same chapter, if not throughout the whole volume, it is best to be consistent with nomenclature (for example, use either [Ni,Fe]-hydrogenase or [NiFe]-hydrogenase not both).

I particularly liked this book; the editors have done a great job of consolidating the many and varied aspects of nickel bioinorganic chemistry. Of particular interest to the readership of *Applied Organometallic Chemistry* will be the chapters on those enzymes, such as methyl-coenzyme M reductase and its nickel corphin coenzyme, and acetyl coenzyme A synthases, and their synthetic mimics, that can be considered to exhibit bioorganometallic chemistry. However, I would recommend that the reader also explores the other chapters to gain a deeper insight into the function of nickel the essential metal.

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