

Book Review

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**Metal complexes and metals in
macromolecules: synthesis, structures
and properties**

Wiley-VCH, 2003,
667 pp; price £115.
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This is a very useful and interesting book for research scientists working in the area of metal-complexed macromolecules in both the biological and non-biological fields, and indeed allows a comparison of the activities and applications of them both.

The first section is directed to a classification of metal complexes and macromolecular metal complexes, including inorganic polymers, and moves onto a description of these compounds in biological systems. This part is little different from many books currently available on bioinorganic chemistry, except that it is more concise and insightful.

The next section is dedicated to a description of the synthesis and structures of a range of metal-containing monomers and the types of polymerization product that can be formed. The binding of

the metal to atoms as part of a polymer chain is elucidated, as well as the binding of metal complexes to side-chain groups on a polymeric support. The ways in which the metal-complexed polymer can then crosslink the polymer chains is discussed, as is electropolymerization, dendrimer formation and hydrogen-bonded metal-complexed networks. The section moves on to discuss coordination to the polymer via the metal site rather than the ligand moiety of the metal complex with a discussion on heteropolymers and metallocenes. The final chapter in this section moves away from chemically bonded metal-complex-polymer systems to those where there is physical embedment in a polymer system, such as metallo-nanoparticles in a dendrimer.

The last section looks at properties and applications, firstly by reviewing the types of small molecule, like olefins and oxygen, that can bind to the metal complexes of the polymers and then examining their transport through membranes of these compounds for applications in gas separation. A brief theory and description of the application of metal-complexed polymers as optical and electrochemical sensors is followed by two chapters dedicated to catalysis, the first on soluble

macromolecular metal complexes and the second on state-of-the-art heterogeneous polymer-bound complexes. This is a very interesting section, as much of the catalysis work on heterogeneous polymer-supported metal complexes originates from Russia, having started with the fixation of metals on polymers for ion exchange. The field is still dominated by Russian scientists with a few exceptions, and with most of the work reported in the Russian literature. Thus, this review is key to opening up the field to scientists from other countries. The last two chapters are dedicated to photocatalysis—of interest to many workers in waste treatment and charge transport—which leads onto electrocatalysis.

This reference work comprises a comprehensive review of the literature, and it is very helpful to have brief but detailed experimental descriptions of synthesis, characterization and applications for nearly all chapters.

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