

Book Review

Inorganic Reactions and Methods. Volume 15: Electron-Transfer and Electrochemical Reactions; Photochemical and Other Energized Reactions, edited by J.J. Zuckerman, VCH Publishers, Weinheim (Germany), 1986, xxiii + 399 pages, DM 298. ISBN 3-527-26273-3.

The concept behind this new series was detailed in the previous review, and so need not be considered here. It is an interesting point, however, that the second volume to appear is Volume 15! This means that this volume is one of the five which deal with subjects that do not fall comfortably into the main classification criterion of the series - bond formation. This volume, then, is one of those concerned with reaction types, and describes chemical reactions induced by the interactions of inorganic materials with electrons and/or photons.

The first section (85 pages) describes electron transfer reactions, and has been written by C. Creutz, N. Sutin and R.G. Linck - a guarantee of a lucid text, if ever there was one. Indeed, this section is an exemplar; it illustrates exactly what can be achieved by this series. It could be read by intelligent undergraduates, postgraduates, lecturers, and practitioners - all would learn and none would waste their time. This is the place to learn about electron transfer reactions. I wish that I could say the same about the following section on electrochemical reactions (87 pages; W.E. Geiger and M.J. Weaver), but I cannot. This section (or, more precisely, the early parts; the last sections on the thermodynamics and kinetics of electrochemical reactions are admirably presented) is insidiously dangerous; the reader is lulled into a sense of understanding made possible by approximations which are not stated. For example, the section on DC cyclic voltammetry (surely one of the most important techniques to inorganic chemists) incorrectly states that $E_{1/2}$ is the same as E' . In general, terms are poorly defined, the text is confusing to read, and the section on electrochemical synthesis (another area of prime interest to the inorganic chemist) is most unhelpful.

Thankfully, the electrochemical section is the only weak area of the book. It is followed by extremely clear and useful descriptions of photochemical reactions (96 pages), subdivided into photosubstitution and photoisomerization reactions, photoinduced cleavage of metal-metal bonds, and photoinduced electron-transfer reactions (written by H.B. Abrahamson, P.C. Ford, G.L. Geoffroy and N. Sutin). The insight and scholarship of these

sections is exactly that expected from such a team of expert authors, and this part of the volume should be compulsory reading for all students and practitioners of photochemistry. It is an invaluable addition to the literature. The volume concludes with a fascinating account of pulse radiolysis (26 pages; M.Z. Hoffman), which describes a less well-known area of chemistry (described, astutely, by the author as the radiation chemical analogue of flash photolysis).

One minor quibble with the volume lies with the list of abbreviations (5 pages) - none of the very specific abbreviations used in this volume for both electrochemical and photochemical phenomena were included. An abbreviations list which does not include the major terms defined within the volume is of only limited use.

Overall, then, this is an immensely useful volume, marred by the poor sections describing electrochemical techniques. However, the sections on electron transfer, photochemistry and pulse radiolysis are each outstanding in their own right, and I have no hesitation in recommending this volume to all chemistry libraries. What a pity that its cost will inevitably restrict the access of students to this volume; it contains much that modern undergraduates and postgraduates should become familiar with. Maybe the publishers will consider bringing out a paperback student edition containing Section 12.2 and all of Section 13.

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