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A review of: “Advances in Oxygenated Processes, Vol. 4”

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BOOK REVIEW

Alfons E. Baumstark (Ed.), *Advances in Oxygenated Processes, Vol. 4*, JAI Press, London, UK, £ 69.50/US \$ 109.50, 1995, ISBN 1-55938-451-4.

This volume is the fourth in a series on oxygenated processes and contains seven review papers in quite different areas. Thus, this volume appears rather inhomogenous although the single reviews generally are well written, presenting the state of the art in the research areas selected.

The first two chapters deal with the oxidation of sulfur compounds, primarily sulfides. Frank Jensen reports on the reaction between sulfides and singlet oxygen and especially his presentation of experimental as well as theoretical investigations of the reaction mechanisms and the possible structures involved appears valuable. In the following chapter Edward Clennan discusses the photooxidation of sulfides with focus on mechanistic aspects based on kinetic studies. Further a discussion of the possible intermediates is included. These two chapters appear to complement each other and give a rather comprehensive overview of the oxidation of sulfides.

In the third chapter Cafferata and Furlong review the thermal decomposition of tetroxanes. The authors discuss possible mechanisms based on kinetic studies suggesting the participation of free radicals originating from initially formed 1,6-biradicals, analogous to the decomposition of other cyclic peroxides. This chapter is somewhat difficult to read due to its home-made nomenclature which must be adopted by the reader in order to follow the discussions.

In the fourth chapter, on the chemistry of cyclic α -azo hydroperoxides, Vasquez and Baumstark discuss the thermal decomposition of the title compounds as well as their use in oxidation processes. It appears that the relative reactivity of α -azo hydroperoxides with respect to oxygen atom transfer is high due to an "intramolecular catalytic effect" which makes these compounds valuable alternative intermediates in oxidation reactions.

The following two chapters deal with pulping and bleaching in relation to paper production. In chapter 5, on the oxidation of lignin, Shevchenko reviews the different possibilities of oxidative wood pulping and bleaching.

The oxidative processes appear, not least from an environmental point of view, as rather interesting alternatives to the classical pulping and bleaching typically involving sulfur and chlorine species. As a special type of oxidative processes the author reviews the possible enzymatically mediated degradation of lignin. In a complementary chapter Ragauskas reports on the application of dioxiranes as oxidation agents in the bleaching of kraft pulp. The report includes the basic bleaching chemistry of dimethyldioxirane as well as a more general discussion of pulp bleaching studies based on dioxiranes. For the uninitiated to this area of applied chemistry these two chapters give quite an interesting introduction to an apparently rather fascinating area of chemistry.

In the final chapter Vasquez, Chen, and Baumstark report on the reaction of trivalent phosphorus compounds with cyclic peroxides such as 1,2-dioxetanes and 1,2-dioxolanes. Especially their mechanistic discussions are commendable.

As already mentioned this volume appears rather heterogeneous in its coverage of a broad spectrum of disciplines ranging from fundamental studies of the singlet oxygen oxidation of sulfides to close to applied studies on pulping and bleaching in paper production. Nevertheless this volume is recommended. Potential readers could well be researchers interested in a specific topic covered by one of this volume's chapters and thus obtaining comprehensive briefing on a particular field, chemists interested in obtaining a broader background in the areas related to their own field, or simply people wishing to widen their chemical horizon.

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