

## *Additions and Corrections*

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**Direct Catalytic Asymmetric Aldol Reaction: Synthesis of Either *syn*- or *anti*- $\alpha,\beta$ -Dihydroxy Ketones** [*J. Am. Chem. Soc.* **2001**, *123*, 2466–2467]. NAOKI YOSHIKAWA, NAOYA KUMAGAI, SHIGEKI MATSUNAGA, GUIDO MOLL, TAKASHI OHSHIMA, TAKEYUKI SUZUKI, AND MASAKATSU SHIBASAKI\*

Page 2467, column 2, Note Added in Proof: The reference to Trost et al. should be replaced by the following: Trost, B. M.; Ito, H.; Silcoff, E. R. *J. Am. Chem. Soc.*, in press.

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## *Book Reviews*

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**Inhibition of Chain Reactions.** By E. T. Denisov and V. V. Azatyán (Institute of Problems of Chemical Physics). Institute of Problems of Chemical Physics University Press and Foundation for International Scientific and Education Cooperation (Realized by Gordon and Breach Publishers): London and Moscow. 2000. xiv + 338 pp. \$120.00. ISBN 90-6994-002-7.

As the title states, this book describes the chemistry of inhibitors, chemical species that reduce the rate of certain chemical reactions or that prevent or delay the oxidative decomposition of organic compounds and materials. In the latter case, the “inhibitor” is more commonly referred to as an antioxidant. In the instances discussed, the mechanism of inhibition involves intercepting a reactive free radical intermediate, and thus, the text also provides an overview of free radical chain processes.

The text has three parts. The first deals with “straight chain reactions”, characterized by elementary steps that consume and produce a reactive free radical (propagation steps) to sustain the chain process. This section discusses the general kinetic characteristics of such processes, including the effect of inhibitors on rate, and treats a number of important topics, including free radical polymerization and the oxidation of hydrocarbons. In addition, important classes of inhibitors (antioxidants), such as phenols and aromatic amines, are discussed separately in considerable detail. The second part of the book covers degenerate chain branching reactions. These are reactions in which the initially formed products provide new pathways for the production of free radicals. This section deals mostly with autoxidation of organic compounds and materials and the chemistry of hydroperoxides (ROOH) and peroxy radicals (ROO<sup>•</sup>). The last section of the book deals with branching chain processes, which are characterized by elementary steps that generate more radicals than they consume. Accordingly, this section considers the effect of inhibitors on ignition, combustion, and explosion.

The reactions are discussed in terms of their kinetics and, to a somewhat lesser extent, their thermodynamics. Many of the reactions of inhibitors with radicals involve atom transfer, typically hydrogen atom transfer. There is an excellent presentation and application of a theory that expresses the activation energy as a function of the bond

strengths of the pertinent chemical species, triplet repulsion in the transition state, etc., enabling the reader to achieve a good appreciation of the factors that govern the rate of these reactions. The text, however, does not go into great detail describing the molecular basis for radical reactivity, structural effects, applications of MO theory, etc. and should not be viewed as a comprehensive treatise on free radical chemistry. To get the most out of the text, the reader will need to be fairly comfortable with chemical kinetics, as most of the reaction mechanisms are discussed in terms of moderately complicated rate equations.

The book is translated from Russian but does not read like a translation, in that the text flows smoothly and is free of grammatical errors. The material is certainly up-to-date, but most of the references predate 1990, partly reflecting the maturity of the field. There are some modern topics discussed, including the effect of hydrogen bonding on the reactivity of phenols as radical traps and the reversibility of nitroxyl radical trapping as related to living free radical polymerizations. What is unique about this book is the number of the references from the Russian literature, presenting data, results, and theories to which many readers would not have easy access. To some extent, this compensates for the paucity of recent references. The book is relatively free of errors. Most of the errors encountered involved chemical species that were mislabeled in chemical equations and were obvious and easy to figure out. A minor, but conceptually important quibble is the consistent use of double-headed arrows,  $\leftrightarrow$ , to denote equilibria.

Finally, though some of the chapters may be of general interest, most of the book is likely to appeal to a narrow audience. Overall, that audience will be pleased. The book is detailed, thorough, and rich with examples. Although not everyone will need this book in his or her personal collection, it is an appropriate addition to any library at a research institution.

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