Book Reviews

Acid–Base Catalysis

Edited by K. Tanabe, H. Hattori, T. Yamaguchi and T. Tanaka, published by Kodansha/Tokyo–VCH/ Weinheim, 1989, 532 + xx pp.

This book contains the Proceedings of the Second International Symposium on Acid–Base Catalysis, held in Sapporo, Japan, Nov. 28 to Dec. 1. 1988, following a previous one held in Villeurbanne, France, 1984. The symposium was organized by the Department of Chemistry of Hokkaido University and chaired by a leading authority in the field of acid–base catalysis Professor K. Tanabe.

The book comprises the text of 9 plenary lectures plus 39 original scientific contributions covering diverse aspects of this very broad field and is organized into four different sections: Organic Synthesis, Characterization, Design and Preparation of Catalysts, Catalytic Features. The major emphasis is given to surface catalysis and its impact on industrial organic chemistry and petrochemistry. Almost unavoidably, because of the wide variety or arguments considered, which span from the theoretical to the most practical ones, the classification under the four sections may be odd in some cases. However, the overview is quite exhaustive and of good quality.

Section 1 (Organic Synthesis) includes 3 reviews and 5 papers dealing with the application of solids like zeolites, clay minerals, Nafion-H®, Mg oxides in a wide variety of organic transformations like dehydration reactions, reduction and oxidation reactions, regioselective ring-openings, alkylation and C–C bond formation reactions, etc.

Section 2 (Characterization) including 3 reviews and 9 papers is devoted to the surface characterization of solids and particularly to the probing of their acidic and basic properties through a variety of techniques. These range from the more traditional ones like IR, UV–Vis and ESR spectroscopies or thermal desorption to the use of molecular probes or the analysis of model reactions. It includes also two attempts to investigate through molecular orbital calculations the local structures of the acidic sites on aluminosilicates and the adsorption of H_2 and CH_4 on MgO.

Section 3 (Design and Preparation of Catalysts) is the largest one (a total of 17 papers) and provides a wide and useful insight into the multifaceted and often empirical approach leading to the design and preparation of catalysts tailored for a specific reaction. The materials considered are those employed in acid–base catalysis like zeolites, metal oxides, dispersed metals on oxides, pillared clays, sulfonated oxides and resins, superbase catalysts, etc.

Section 4 (Catalytic Features) is dedicated mostly to the reactivity of acid–base materials in reactions of industrial significance. The latter two sections are almost completely due to contributions of Japanese researchers and testify the high quality standard and interest for research in this field in Japan. The section is concluded by an excellent review paper on acid–base bifunctional catalysis by Professor Tanabe.

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Biocoordination Chemistry: Coordination Equilibria in Biologically Active Systems

Edited by Kalman Burger, published by Ellis Horwood, Chichester, U.K., 1990, 349 pp., US$90.–.

Biocoordination Chemistry is the coordination chemistry of biologically active molecules (proteins, polypeptides, carbohydrates, nucleotides, nucleosides, alkaloids, etc.) which contain electron pair donor atoms and therefore behave as potential ligands.

As K. Burger states in the introduction "Most bioactive molecules contain various numbers of donor groups, many of them having similar, but not identical, basicities and metal ion affinities. Numerous strongly overlapping protonation and metal complexation equilibria are, therefore, characteristic of such systems. These equilibria are also influenced by intramolecular interactions (e.g. H bonds) due to the ordered conformation (helical, globular etc.) of the macromolecule. All this makes an exact evaluation of the experimental equilibrium data on such systems difficult." This recognition led to a new complex discipline, which makes use of the theoretical and experimental armoury of inorganic and coordination chemistry and molecular biology: biocoordination chemistry.

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