

Book Review

Metal Clusters in Catalysts. Editors B. C. Gates, L. Guzzi and H. Knözinger, Elsevier, Amsterdam, 1986, ISBN 0-444-42708-2, xxvii + 648 pp., Dfl. 195.00.

This book (in three Parts) represents a critical evaluation of the literature and prospects of metal cluster chemistry. Metal clusters constitute an extensive new class of compounds offering new modes of bonding of ligands to metals and subtle new patterns of reactivity.

Part I deals with molecular chemistry and structures of metal clusters. The first chapter is devoted to the synthesis of mono- and multi-metallic clusters, with particular attention to bridged assisted reactions where the ligand is functioning as a bridge between the metals in the final product. Chapter two covers structural characterization of metal clusters. Chapter three deals with thermochemical properties and bond energies of transition metal clusters with implications for catalysis. Reactivity is discussed in Chapter four where aspects that have relevance to catalysis are emphasized. Finally, homogeneous catalysis by metal clusters is treated in Chapter five.

Part II, the largest section of the book is concerned with metal clusters in and on solid supports. Chapter six provides comprehensive coverage of the theoretical and experimental approach for the characterization of supported metal clusters by physical

methods: vibrational and optical spectroscopies, magnetic resonance, photoelectron and Mössbauer spectroscopies, X-ray absorption spectroscopy, and thermoanalytical methods are treated. Chapter seven reports the dispersed metal clusters from metal vapor chemistry. Metals aggregates are important subjects of several chapters. Chapter eight is concerned with metals in zeolites and Chapter nine is devoted to metal-oxide supported catalysts derived from molecular metal clusters. Chapter ten includes a detailed discussion of supported bimetallic catalysts derived from molecular metal clusters.

Part III is a single Chapter (11) addressing the relationships between metal clusters and metal surfaces.

In summary the book is an excellent review of the present knowledge of the chemistry of metal clusters on surfaces. The subject of metal clusters in catalysis is growing and understanding of the clusters will propel the advance of fundamental research in catalysis, organometallic chemistry and surface science.

The material is well-written and provides detailed coverage of the topics, including references up through 1984.

This book is dedicated to Prof. Yu Yermakov in memory of his fruitful scientific activity and human qualities.

Roberta Bertani