

Book Review

Metal Clusters in Chemistry

Edited by P. Braunstein, L.A. Oro and P.R. Raithby, Wiley-VCH, Weinheim, 1999. ISBN 3-527-29549-6; DM1398, SFr1244. pp. 1798 in 3 volumes

Metal cluster chemistry is a burgeoning subject that spans the interface between molecular and solid-state chemistry and impacts on the behaviour of biological systems. This three-volume work concentrates essentially on systems which follow the early definition by Cotton of metal clusters, namely compounds that 'contain three or more metals held together, at least in part, by metal-metal bonds'. It is based mainly on research which has been carried out in European laboratories and discussed during the European Scientific Network activities. Therefore, more than seventy contributions contained in these volumes originate from European laboratories and although there is no doubt that the authors are world experts in this research field, to give balance the editors also invited overviews, which precede the various sections of the text, from a number of non-European experts. This has resulted in a number of detached views, that are of benefit to the reader, of the content of the articles and the general research.

As one would expect from the number of contributors, coverage of the research field is comprehensive and recent, with references generally reaching to 1998. The volumes are entitled: (1) Molecular Metal Clusters; (2) Catalysis and Dynamics and Physical Properties; and (3) Nanomaterials and Solid State Chemistry. They are divided into seven major subsections that are discussed individually as follows.

Section 1, Molecular Clusters, concentrates on the synthesis and structural properties of clusters. It is wide-ranging, containing twenty-nine articles, and covers synthesis of homo-metallic, hetero-metallic and non-metal-containing clusters with some reference to physical and theoretical properties.

Section 2, Metal Clusters in Catalysis, is concerned with the important interface between homogeneous and heterogeneous catalysis. It contains twelve articles that range from reports of the direct study of catalytic systems to consideration of the relationship between the

surfaces of metallic catalysts and the structural and electronic properties of clusters as their models.

Section 3, Dynamic and Physical Properties, (fifteen articles), considers the various means, principally spectroscopic but theoretical also, that are used to evaluate the various dynamic processes which clusters can undergo and that might be important in the mechanisms of their reactions.

Section 4, Nanomaterials, (eight articles) concentrates on high nuclearity clusters and discusses the synthesis of such clusters, both free and supported, and their prospects as models for nano-sized metal particles (1–100 nm) and as future catalysts.

Section 5, Solid-state Cluster Chemistry, (nine articles) considers the aggregation of clusters into arrays that can have various linkages and lie in any of three dimensions.

Section 6, Bibliography of Reviews, 1988–1997 is a compilation of recent literature that is particularly useful in the context of what is very much a series of research articles rather than reviews.

Section 7, Retrospective and Prospective Considerations in Cluster Chemistry, is an absorbing view of the area from Jack Lewis, who has been at the forefront of cluster research for some 40 years.

Because 'Metal Clusters in Chemistry' is multi-authored and somewhat research-conference based, the articles within it are varied in length and of limited general appeal. This is mitigated by the sheer breadth of coverage within the field and the inclusion of the bibliographic guide. Nevertheless this aspect and the high cost of the three volumes mean that its appeal will be limited mainly to research workers in the field, who should find it a very readable and comprehensive source of current information.

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