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Book Reviews

Inorganic Chemistry Concepts, Vol. 6. Inorganic Stereochemistry, by D.L. Kepert. Editors C.K. Jørgensen, M.F. Lappert, S.J. Lippard, J.L. Margrave, K. Niedenzu, H. Noth, R.W. Parry and H. Yamatera. Springer Verlag, Berlin, 1982, 206 Figs., 45 Tables, 227 pp., Cloth DM 154.00.

The stereochemistry of coordination complexes has been a critically important underlying theme of coordination chemistry since its inception in the work of Werner. David Kepert has long been known as a major contributor to our understanding of the variations in coordination number and stereochemistry from one complex to another, especially with regard to coordination numbers greater than 6. This book is based on a series of such contributions in *Progress in Inorganic Chemistry*. However, the earlier articles are integrated and brought up to date in a monograph which is sure to be of inestimable value to all who puzzle over stereochemistry. The validity of the repulsion approach in understanding stereochemistry is discussed in very considerable depth and its advantages and limitations exposed. Chapters trace through the various classical polyhedra and their chemical analogs, and proceed through a discussion of all coordination numbers from 4 through 12 (but excluding 11!). The chapters are broken down into presentation of unidentate, bidentate, chelate and mixed systems, and all theoretical possibilities explored. Considerable emphasis is placed on potential energy surface diagrams for predicting viable stereochemistries, and many examples are presented through citation of over 1100 references. All-in-all a very valuable contribution to the literature of Coordination Chemistry.

The Editor's Desk

Structure and Bonding, Vol. 39. Electrons and Transitions. Editors J.D. Dunitz, J.B. Goodenough, P. Hemmerich, J.A. Ibers, C.K. Jorgensen, J.B. Neilands, D. Reinen and R.J.P. Williams. Springer Verlag, Berlin, 1980, 32 Figs., 16 Tables, 120 pp., Cloth DM 64.00.

As the title suggests, this volume is devoted to a series of chapters dealing with aspects of the electronic structure of molecules and surfaces.

Clack and Warren (Cardiff) discuss the "Metal–Ligand Bonding in 3*d*

Sandwich Complexes" (41 pp., 80 refs.). After an initial historical survey and discussion of the structure of high symmetry sandwich systems in terms of simple ligand field theory, the authors survey the magnetic (static and ESR) properties of symmetric dicyclopentadiene and dibenzene systems. Following this, a discussion of the photoelectron spectra of these species leads in to an extensive section dealing with various molecular orbital approaches to the analysis of these complexes. The chapter finishes with a detailed analysis of the electronic structure of mixed sandwich complexes such as the CpMBz complexes. Bond orders and orbital populations are analysed.

Stephen Mason (Kings College, London) has been a pioneer in the introduction of the ligand polarisation model for the study of the electronic structure of metal complexes. His chapter is "The Ligand Polarisation Model for the Spectra of Metal Complexes: The Dynamic Coupling Transition Probabilities" (38 pp., 82 refs.). The fundamental difference between crystal field theory and ligand polarisation theory arises from the fact that in the former, we consider the ligand to perturb the metal, while in the latter, the metal is considered to perturb the ligand. Crystal field theory has proved a powerful means of analysing transition energies in *d* and *f* block ions, but has been less useful in the calculation of intensities.

This chapter shows how the ligand polarisation model can be applied to the derivation of oscillator strengths in both transition metal and lanthanide complexes, the rotational strengths of chiral coordination compounds, and the Faraday effect terms of achiral complexes.

The third and final chapter is "Sulfur Interaction with Metallic Surfaces and Interfaces studied by Auger Electron Spectrometry" by Lucette R. Balsenc (Geneva) (31 pp., 286 refs.). Auger spectroscopy involves the absorption, in this case at a surface, of an incident electron of sufficient energy to promote an inner binding (core) electron into an allowed state above the Fermi level. The core vacancy left behind will be filled by an electron from a higher level, and energy is conserved by emission of another (Auger) electron (or X-ray photon). This technique is a powerful means of analysing surfaces, especially in the monolayer and sub-monolayer range. This chapter discusses the influence of sulfur at surface sites, with especial reference to heterogeneous catalysis and the metallurgical problems of segregation, surface self-diffusion and embrittlement. The author discusses how the angular dependence of Auger emissions can be used to locate adsorption site positions, and because of its high speed and small surface requirement, can be used to analyse kinetic processes at grain boundaries or fracture sites.

This Volume contains an author index to Volumes 1–39.

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