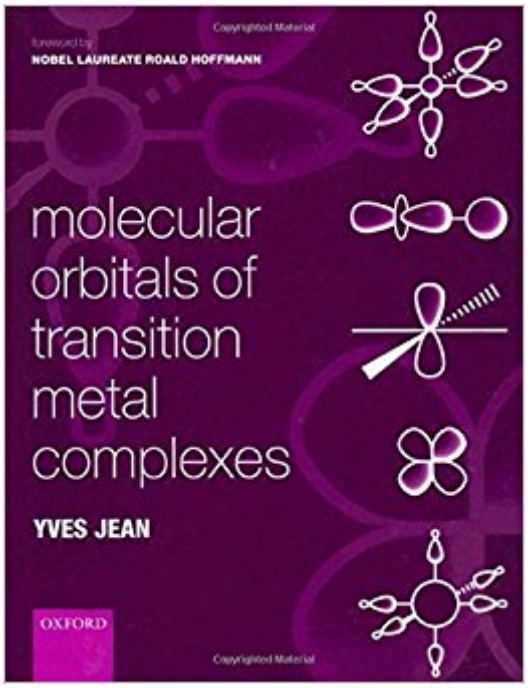
Molecular Orbitals Of Transition Metal Complexes



Synopsis

This book starts with the most elementary ideas of molecular orbital theory and leads the reader progressively to an understanding of the electronic structure, geometry and, in some cases, reactivity of transition metal complexes. The qualitative orbital approach, based on simple notions such as symmetry, overlap and electronegativity, is the focus of the presentation and a substantial part of the book is associated with the mechanics of the assembly of molecular orbital diagrams. The first chapter recalls the basis for electron counting in transition metal complexes. The main ligand fields (octahedral, square planar, tetrahedral, etc.) are studied in the second chapter (sigma interactions) and the structure of the "d block" is used to trace the relationships between the electronic structure and the geometry of the complexes. The third chapter studies the change in analysis when the ligands have pi-type interactions with the metal. All these ideas are then used in the fourth chapter to study a series of selected applications of varying complexity (structure, reactivity). The fifth chapter deals with the "isolobal analogy" which points out the resemblance between the molecular orbitals of inorganic and organic species and provides a bridge between these two subfields of chemistry. The last chapter is devoted to a presentation of basic Group Theory with applications to some of the complexes studied in the earlier chapters.

Book Information

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Customer Reviews

`... an exceptionally clear teacher [...] This book is so pedagogical that it should be a great success and should be used widely [...] It corresponds ideally to what is needed.'O. Eisenstein, University of

Montpellier`... excellent -- it covers both the foundations, necessary molecules, and interesting bonding puzzles.'R. Hoffmann, Cornell University, Nobel Laureate Chemistry 1981

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I highly recommend this book if you try to have insights into the details of structure and reactivity in organometallic chemistry and catalysis. Very helpful for further understanding of MO theory.

The book arrived in a timely manor and was in excellent condition. The price was good. I would recommend to others using the text for a class, or looking for a good reference book.

This book was assigned for my introductory inorganic chemistry course at Caltech. Its strong points are that it covers most common inorganic complex shapes and derives their MO diagrams in a simple and easy-to-follow way. The exercises are also relatively well-written and contain answers. The caveat is that you have to do some work on the side to understand what is going on, and some diagrams could be better listed. For example, the LGOs are shown 150+ pages away (in the appendices) from where their relevant groups are discussed, and a brief introduction to the Huckel method would have been appreciated. The source of character tables could have been explained a bit more clearly as well, and there is little to no underlying derivation of the group theory (the words dihedral group, etc. are never mentioned). But all in all, it's an OK introduction.

Transition Metal Compounds (Physics and Chemistry of Materials with A) Transition Metal Oxides: An Introduction to Their Electronic Structure and Properties (The International Series of Monographs on Chemistry) The Mechanisms of Reactions at Transition Metal Sites (Oxford Chemistry Primers) Transition Metal Sulfur Chemistry: Biological and Industrial Significance (ACS Symposium Series) The Topology of CW Complexes The Chemistry of Macrocyclic Ligand Complexes (Cambridge Texts in Chemistry and Biochemistry) Molecular Chemistry of the Transition Elements: An Introductory Course Precious Metal: Decibel Presents the Stories Behind 25 Extreme Metal Masterpieces Heavy Metal Africa: Life, Passion, and Heavy Metal in the Forgotten Continent