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Function Based Methods; 2.2.2 Density Functional Methods; 2.2.3 Simplified Methods; 2.3 Structure and Properties of Naked Clusters; 2.3.1 The Theoretical Description of Metal Clusters; 2.3.2 Structure, Bonding, and Stability; 2.3.2.1 Geometrical Structures; 2.3.2.2 The Jellium Model; 2.3.2.3 Fluxionality; 2.3.2.4 Stability and Fragmentation; 2.3.2.5 Bond Lengths
2.3.2.6 Electron Delocalization in Clusters 2.3.3 Ionization Potentials and Electron Affinities; 2.3.4 Electronic States, "Band Structure", and Band Gap; 2.3.5 Optical Responses; 2.3.6 Clusters in External Fields; 2.3.6.1 Magnetic Behavior; 2.3.6.2 Electric Polarizability; 2.4 Structure and Properties of Ligated Clusters; 2.4.1 The Metal - Ligand Interactions; 2.4.2 Structures and Bond Lengths; 2.4.2.1 Geometrical Structures; 2.4.2.2 Metal - Metal Bond Lengths; 2.4.2.3 The Ligand Polyhedron; 2.4.3 Topological Relationships and Simplified Bonding Models
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2.4.4.6 Clusters with Interstitial Atoms 2.4.5 Physical Measurements and Chemical Bonding; 2.4.5.1 Photoelectron Spectroscopy; 2.4.5.2 Optical Spectroscopy; 2.4.5.3 Magnetic Susceptibility Measurements; 2.4.5.4 ESR Spectra; 2.4.5.5 NMR Spectra; 2.4.5.6 Specific Heat; 2.4.5.7 Redox Properties; 2.5 Conclusions; 2.5.1 The Role of Theory in Clusters Research; 2.5.2 On the Analogy between Metal Clusters and Surfaces; References; 3 Clusters in Ligand Shells; 3.1 Introduction; 3.2 Low-valent Organometallic Clusters
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3.2.5 Transition Metal Clusters Containing Main Group Elements

Sommario/riassunto

This book offers a comprehensive overview of the rapidly developing field of cluster science. In an interdisciplinary approach, basic concepts as well as recent developments in research and practical applications are authoritatively discussed by leading authors. Topics covered include 'naked' metal clusters, clusters stabilized by ligands, clusters in solids, and colloids. The reader will find answers to questions like: * How many metal atoms must a particle have to exhibit metallic properties? * How can the large specific surface of clusters and colloids be employed in catalysts?
