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Dioxygen Activation; 3.1 Introduction; 3.2 Dinuclear Iron Peroxo Complexes; 3.3 Tripodal Tetradentate Ligands and Derivatives 3.3.1 Tmpa3.3.2 Uns-penp; 3.4 Mononuclear Iron Peroxo Complexes; 3.5 Mononuclear Iron Oxo Species; 3.6 Work in Progress; 3.7 Conclusions; References; 4 Tuning of Structures and Properties of Bispidine Complexes; 4.1 Introduction; 4.2 Jahn-Teller Isomerism with Copper(II) Bispidines; 4.3 Stabilization of High-spin Ferryl Complexes; 4.4 Jahn-Teller-distorted Cobalt(III) Complexes; 4.5 Conclusions; References; 5 Novel Phosphorus and Nitrogen Donor Ligands Bearing Secondary Functionalities for Applications in Homogeneous Catalysis; 5.1 Introduction; 5.2 Phosphine Ligands 5.2.1 Cooperative Effects for Ligand Self-organization5.2.2 Phosphines with Pyrazole and Pyrimidine Substituents; 5.3 Nitrogen Donor Ligands Without Phosphorus Sites; 5.4 Conclusion; References; 6 Square-Pyramidal Coordinated Phosphine Iron Fragments: A Tale of the Unexpected; 6.1 Introduction; 6.2 Polyphosphine Ligands with Three and Four Coordinating Arms; 6.3 C-P Bond Activation and Agostic Interactions in Iron Complexes of Polypodal Phosphine Ligands; 6.4 Mechanistic Considerations; 6.5 Conclusion; References 7 Regioselective Catalytic Activity of Complexes with NH,NR-substituted Heterocyclic Carbene Ligands7.1 Introduction; 7.2 Concept of Regioselective Substrate Activation; 7.3 Synthesis of Complexes with NH,NR-stabilized NHC Ligands; 7.4 Preparation of Substrates for Catalytic Experiments; 7.5 Catalysis Experiments; 7.6 Conclusions and Summary; References; 8 Functionalized Cycloheptatrienyl-Cyclopentadienyl Sandwich Complexes as Building Blocks in Metallo-supramolecular Chemistry; 8.1 Introduction 8.2 Syntheses and Electronic Structures of Group 4 Cycloheptatrienyl-Cyclopentadienyl Sandwich Complexes

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#### Sommario/riassunto

The use of secondary interactions for the activation of non-reactive substrates constitutes a new and modern approach in catalysis. This first comprehensive treatment of this important research field covers the entire field and reveals the links between the various chemical disciplines. It thus adopts an interdisciplinary approach, making it of interest to the whole chemical community. A must for organic, inorganic, catalytic and complex chemists, as well as those working with/on organometallics.

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