



# The Organometallic Chemistry of the Transition Metals, 4th Edition

By Crabtree, Robert H.

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Summary: Preface. List of Abbreviations. 1 Introduction. 1.1 Werner Complexes. 1.2 The Trans Effect. 1.3 Soft Versus Hard Ligands. 1.4 The Crystal Field. 1.5 The Ligand Field. 1.6 Back Bonding. 1.7 Electroneutrality. 1.8 Types of Ligand. 2 General Properties of Organometallic Complexes. 2.1 The 18-Electron Rule. 2.2 Limitations of the 18-Electron Rule. 2.3 Electron Counting in Reactions. 2.4 Oxidation State. 2.5 Coordination Number and Geometry. 2.6 Effects of Complexation. 2.7 Differences between Metals. 2.8 Outer-Sphere Coordination. 3 Metal Alkyls, Aryls, and Hydrides and Related  $\eta^2$ -Bonded Ligands. 3.1 Transition Metal Alkyls and Aryls. 3.2 Related  $\eta^2$ -Bonded Ligands. 3.3 Metal Hydride Complexes. 3.4  $\eta^2$  Complexes. 3.5 Bond Strengths for Classical  $\eta^2$ -Bonding Ligands. 4 Carbonyls, Phosphine Complexes, and Ligand Substitution Reactions. 4.1 Metal Complexes of CO, RNC, CS, and NO. 4.2 Phosphines and Related Ligands. 4.3 Dissociative Substitution. 4.4 Associative Mechanism. 4.5 Redox Effects, the I Mechanism, and Rearrangements in Substitution. 4.6 Photochemical Substitution. 4.7 Steric and Solvent Effects in Substitution. 5 Complexes of  $\eta^2$ -Bound Ligands. 5.1 Alkene and Alkyne Complexes. 5.2 Allyl Complexes. 5.3 Diene Complexes. 5.4 Cyclopentadienyl Complexes. 5.5 Arenes and Other Alicyclic Ligands. 5.6 Metalacycles...



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