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Nota di contenuto	1. General Introduction -- 2. Modification of QuinoxP*-Type Bisphosphine Ligands for High-Performance Asymmetric Boryl Substitution of Racemic Allyl Electrophiles -- 3. Allylcopper(I) Isomerization-Enabled Copper(I)-Catalyzed Intramolecular Alkylboration of Terminal Allenes -- 4. Intermolecular Alkylboration of gem-Disubstituted Allenes for Stereoselective Synthesis of Multi-Alkylated Allylic Boronates -- 5. Computational Investigation on Copper (I)-Catalyzed Enantioselective Radical Borylation of Benzyl Halides -- 6. Summary of This Thesis.
Sommario/riassunto	This book focuses on the development of novel functionalized organoboron compounds and those synthetic methods. High degrees of chemo-, regio-, and stereoselectivities of the borylation reactions are attained through catalyst design and optimization. Furthermore, the selectivity-determining mechanisms are analyzed with state-of-the-art DFT and other computational methods. In this book, the author synthesizes some multi-substituted alkenyl and allylic boronates via borylation reactions using a copper(I)/diboron catalyst system. Those compounds contain novel densely substituted and distorted structures, which have not been accessed by other methods. The high stereoselectivities are achieved by the optimization of the catalyst,

especially the ligand. Some new ligands are also developed in this book. Furthermore, the derivatization of the borylation products is demonstrated to access the sterically demanding complex molecules. Also, the author performs computational analysis to reveal how the catalyst controls the selectivities. The deep insight into the reaction mechanism provides guides for rational catalyst design for not only copper(I) catalysis but also other transition metal catalysis. Thus, the content should be of interest to academic and industrial scientists in a wide range of areas. .