

Table of Contents

	Page
1 The System Boron-Noble Gases	1
1.1 General Remarks	1
1.2 Binary Systems	1
1.2.1 Neutral Molecules	1
1.2.2 Cationic Species	2
1.3 Systems Containing Additional Elements	5
1.3.1 Neutral Molecules	5
1.3.2 Cationic Species	7
2 The System Boron-Hydrogen	9
2.1 Introductory Remarks	9
2.2 Monoboron Species	11
2.2.1 The BH Molecule	11
2.2.2 Ions and Other Derivates of BH	13
2.2.3 Monoborane(2), BH ₂ , Its Ions and Derivatives	15
2.2.4 Monoborane(3), BH ₃	16
Introductory Remarks	16
Physical Properties	16
Complexes of BH ₃ with N-, P-, O-, and S-Bases	18
Carbon Monoxide-Borane, BH ₃ -CO, and Its Derivatives	23
Substituted Boranes, RBH ₂ and R ₂ BH	25
Ions Derived from BH ₃	31
2.2.5 The Tetrahydroborate Anion, [BH ₄] ⁻ , and Its Substitution Products	32
Synthesis of Salts and Complexes of the Tetrahydroborate Anion	33
Physical Properties of Compounds Containing the Tetrahydroborate Group	51
Theoretical Studies	51
X-Ray Structural Data of Tetrahydroborates	60
X-Ray Structural Data of Substituted Tetrahydroborates	67
Miscellaneous Data on Unsubstituted Species	72
Miscellaneous Data on Substituted Species	86
Chemical Properties of Tetrahydroborates	100
Reactions of Tetrahydroborates with Organic Compounds	100
Reactions of Tetrahydroborates with Inorganic and Organometallic Compounds ..	102
Chemical Properties of Substituted Tetrahydroborates	110
2.2.6 The Species [BH ₄] [•] , [BH ₄] ⁺ , and "BH ₅ "	112
2.2.7 Metallaboranes Containing One Boron Atom and Ions Thereof	114
Boron-Bridged Tri- and Tetra-Nuclear Iron Carbonyls Containing BH _{4-x} Groups	114
Boron-Bridged Trinuclear Iron Carbonyls Containing RBH _{3-x} Groups	117
Further Miscellaneous Boron-Bridged Trinuclear Carbonyls	120

	Page
2.3 Diboron Species	122
2.3.1 Diborane(6), B_2H_6 , and Adducts Thereof	122
Preparation	123
Physical Properties	123
Chemical Properties	128
2.3.2 Substituted Diboranes(6)	130
2.3.3 Diborane(4), B_2H_4 , and Its Derivatives	134
Preparation and Characterization	135
Theoretical Studies	138
2.3.4 Diborane(3), $[B_2H_3]^+$, Ions of the Types $[B_2H_n]^+$, $[B_2H_n]^-$, $[(B_2H_2)_2]^-$, and Derivatives of $[B_2H_3]^+$	140
2.3.5 The Heptahydrodiborate(1-) Ion, $[B_2H_7]^-$	143
2.3.6 Diborene, $HB=BH$, and Derivatives	144
2.3.7 Metallaboranes Containing Two Boron Atoms and Ions Thereof	145
 Physical Constants and Conversion Factors	 156