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Studies on the synthesis, characterization, and chemical behavior of pyrazaboles, semi-pyrazaboles, poly(1-pyrazolyl)borates, boroxins, diboroxanes, and borazines have been performed.

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Studies on Macromolecules Derived from Pyrazolylboron and Related Boron-Nitrogen Species

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SUMMARY OF RESULTS*

Several pathways for the synthesis and chemical modification of pyrazaboles, which are characterized by the general framework $B(\mu\text{-pz})_2B$ (where Hpz = pyrazole) and contain a central B_2N_4 heterocycle, have been developed [1-3, 5, 9, 11-14, 17-19, 22, 27, 28, 30]. Besides normal pyrazaboles [1-3, 5, 14, 19, 22, 27], triply bridged derivatives [9, 11-13, 18], polynuclear materials with repeating $B(\mu\text{-pz})_2$ units [7, 17], and semi-pyrazaboles [12, 22] have been prepared and characterized, including a series of X-ray crystal structure determinations [2, 4, 12-14, 17, 18, 31]. Various polynuclear materials containing $B(\mu\text{ pz})_nM$ units (M = metal) [10, 17] and poly(1-pyrazolyl)borates [5, 8, 10, 20, 27, 28, 30, 32] have also been studied. Some corresponding derivatives of azoles other than pyrazole have been investigated [24, 29, 31], highlighted by the preparation and characterization of a novel porphine-analogue containing a B_4N_{12} heterocycle [24]. Theoretical studies on selected species have been performed [6, 31]. Studies on boroxins have been concerned with structural aspects [15] and on base adducts of boroxins with hydrazines [16] and ethylenediamines [23], as well as the reaction of boroxins with pyrazole [11, 13]. In addition, some chemistry of diboroxanes has been explored [11, 26]. Studies on borazines have centered on their reactions with pyrazole [12] and on approaches to the preparation of precursors to macromolecules and polymers based on B-N units. In this context the development of a convenient preparation of unsymmetrically B-substituted borazines seems to be most noteworthy [33, 34]; it ultimately led to the preparation and characterization of various types of polyborazines [34, 36]. The preparation of unsymmetrically N-substituted borazines has also been pursued [37]. Finally, some B-N-C heterocycles have been studied [21, 22, 25, 26].

*Relevant technical reports are cited in brackets.

TECHNICAL REPORTS ISSUED

- # 1 (April 1984): Studies on B-(Pyrazol-1'-yl)pyrazaboles
- # 2 (July 1984): The Bromination of Pyrazabole
- # 3 (November 1984): Syntheses and Reactions of Pyrazaboles
- # 4 (November 1984): Structures of Three Pyrazaboles: 1,3,5,7-Tetramethylpyrazabole, 4,8-Bis(pyrazol-1'-yl)pyrazabole; 4,4,8,8-Tetrakis(pyrazol-1'-yl)pyrazabole
- # 5 (December 1984): Boron Derivatives of 3-Methylpyrazole
- # 6 (January 1985): Theoretical Studies on N-Bonded Pyrazole Derivatives of Boron
- # 7 (March 1985): Polyboron Spiro-Cations Based on Bridging Dipyrazol-1-ylboryl Units
- # 8 (June 1985): The Dimethylamino-tris(1-pyrazolyl)borate(1-) Ion, A New Hybrid Poly(1-pyrazolyl)borate Ligand
- # 9 (July 1985): Triply-Bridged Diboron Species of the Pyrazabole Type
- # 10 (October 1985): Polynuclear Pyrazolyl-Bridged Spiro Species Containing Boron and Metal Centers
- # 11 (January 1986): Reactions of Boroxines and Diboroxanes with Pyrazole
- # 12 (August 1986): Reactions of Borazines with Pyrazole and Some Related Studies
- # 13 (September 1986): Chemical Behavior and Structure of Triply-Bridged Pyrazaboles of the Type $RB(\mu-pz)_2(\mu-OBRO)BR$
- # 14 (January 1987): Studies on B-Halogenated Pyrazaboles
- # 15 (January 1987): Structure and Thermal Motion of Triphenylboroxin
- # 16 (July 1987): Hydrazine Complexes of B-Triorganylborexins
- # 17 (September 1987): Pyrazole Derivatives of Diborane(4)
- # 18 (January 1988): Preparation and Crystal Structure of a New Type of Triply Bridged Pyrazabole
- # 19 (May 1988): Pyrazaboles of the Type $RR'B(\mu-pz)_2BRR'$
- # 20 (June 1988): Palladium(II) Tetrakis(1-pyrazolyl)borate and Some Related Species
- # 21 (November 1988): Reactions of N,N'-Dimethylurea with Some Boron-Nitrogen Compounds
- # 22 (March 1989): Reactions of Some Boron Heterocycles with Pyrazole
- # 23 (March 1989): Complexes of B-Triethylboroxin with Ethylenediamine and Derivatives Thereof
- # 24 (July 1989): Triazaboles and Related Triazole Derivatives of Boron

- # 25 (July 1989): New Boron–Nitrogen Analogues of Uracil Derivatives
- # 26 (September 1989): Preparation and Reactions of Di(aminoboryl) Oxides
- # 27 (October 1989): Pyrazole Derivatives of 9–Borabicyclo[3.3.1]nonane
- # 28 (April 1990): Pyrazole Derivatives of Three–Coordinated Boranes
- # 29 (August 1990): N–Triazolylboranes
- # 30 (September 1990): Boron Derivatives of 3–Ferrocenylpyrazole
- # 31 (October 1990): N–Bonded Triazole Derivatives of Boron: *cyclo*–Tetra(triazolylboranes)
- # 32 (October 1990): Tin(II) Poly(1–pyrazolyl)borates
- # 33 (March 1991): Convenient Synthesis of Unsymmetrically B–Substituted Borazines
- # 34 (May 1991): Preparation of Unsymmetrically B–Substituted Borazines and Characterization of Tris(4,6–diethylborazin–2–yl)amine
- # 35 (June 1991): Diorganyltin(IV) Di–Poly(1–pyrazolyl)borates and Related Species
- # 36 (August 1991): Preparation and Characterization of Some Polyborazines
- # 37 (September 1991): Studies on 1–Trimethylsilyl–2,4,6–triethylborazine and Related Species

END-OF-THE-YEAR REPORTS

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