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Preface

Boron Chemistry at the Millennium

The chemistry of boron exhibits many unique features that distinguish boron from any other element. Thus boron demonstrates exceptional ability in molecular, ionic, and solid state environments to form very stable compounds exhibiting structures based on icosahedral and other deltahedral units. In addition, boron forms a variety of very stable mononuclear tetrahedral as well as polynuclear cage anions including some of the most weakly coordinating anions currently known. The hydride chemistry of boron is also unusually rich, providing diverse examples of multicenter bonding, which have stimulated numerous theoretical and computational studies. These features of boron chemistry can be considered to be as distinctive as the unique features of the much better known chemistry of carbon in organic compounds including the exceptional catenation ability of carbon as well as the wide range of compounds containing stable benzenoid and related structural units.

These and other special features of boron chemistry have led to a variety of applications of diverse boron compounds. Thus various solid state metal borides are useful for novel superconductors and thermionic emitters. Borates are useful in detergents and in special borosilicate glasses. Borohydrides and other boron–hydrogen compounds have diverse applications in organic synthesis. Biomedical applications of boron include the use of boron-rich cage compounds in boron neutron cancer chemotherapy. Environmental applications of boron compounds include the use of tetraphenylborate or boron cage compounds for the separation of radioactive cesium from high-level nuclear wastes.

In the late 1990s I organized a workshop on fundamental and applied boron chemistry, which was held at the University of Georgia in May, 1998. Planning this workshop led to a more ambitious goal than the workshop itself, namely organizing a publication that would reflect the status of boron chemistry at the turn of the millennium. Since the exciting areas of boron chemistry pertain to both inorganic and organometallic chemistry, the idea was launched to publish twin special issues of the two journals *Inorganica Chimica Acta* and the *Journal of Organometallic Chemistry*. The general idea is that papers on inorganic boron chemistry including solid state boron chemistry would appear in the special issue of *Inorganica Chimica Acta* and papers on organoboron chemistry including applications of boron compounds in organic synthesis would appear in the special issue of the *Journal of Organometallic Chemistry*. In addition, a book was planned containing all of the papers from both of the special issues.

In order to implement this objective, boron chemists from all over the world were invited to contribute articles to these publications. The resulting manuscripts were all subject to review before publication. This process led to 18 papers for the special issue of *Inorganica Chimica Acta* and 23 papers for the special issue of the *Journal of Organometallic Chemistry*. We hope that the readers will find the results worth our effort and that this collection of papers on boron chemistry will stimulate exciting research and development work on boron chemistry into the next millennium.

I would like to acknowledge the assistance of my secretary, Ms Peggy Norman, with the clerical work involved in the review of the papers in these special issues as well as that associated with the organization of the May 1998, workshop. Last but certainly not least, I would like to acknowledge the patience of my wife, Jane, during the period that I was heavily involved in these projects on boron chemistry.

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