NEW SYNTHETIC APPROACHES TO BORON HYDRIDE TRANSFORMATIONS

FINAL REPORT
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The project was concerned with the development of new synthetic routes to polyhedral boron cage compounds. This work resulted in new methods for the preparation of several important classes of compounds, including new mono-, di-, and tetra-carbon carboranes, multi-cage boranes and carboranes, and large single cage boranes.
Summary of Scientific Goals and Results

Stable, high-boron content materials, such as the polyhedral boranes and carboranes, are known to have a great number of potential practical applications, including uses in polymers, burning-rate accelerators and medical therapies. However, because of the low yield, non-selective synthetic methods which have generally been used to obtain these types of compounds their actual utilization has been limited. The main goal of our work which was sponsored by the Army Research Office was to investigate the fundamental processes involved in boron hydride transformations and to apply these results to the development of new high yield, low energy, selective synthetic routes for polyhedral boron compounds.

In our work we have taken several different approaches to these problems and these have resulted in major advances toward the goals outlined above. Important results have included (1) the discovery of a new pathway to higher cage materials via boron-boron coupled multicage compounds (2) the development of new synthetic routes to mono-, di-, and tetra-carbon carboranes and (3) the synthesis and structural characterization of a variety of new metalla-borane, -carborane and -thiaborane complexes with unusual properties.

Results of this project have been described in detail in the publications and progress reports listed below:

Publications:


Progress Reports:

No.
1. 1/1/85-6/30/85
2. 7/1/85-12/31/85
3. 1/1/86-6/30/86
4. 7/1/86-12/31/86
5. 1/1/87-6/30/87
6. 7/1/87-12/31/87

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