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## Gas Phase Studies of Boron, Silicon, and Aluminum -- Relationship to Carbon-Carbon Composition

 Authors: [R. Damrauer](#); [V. M. Bierbaum](#); [M. S. Gordon](#); [M. Kremp](#); [M. Stephan](#); [COLORADO UNIV AT DENVER](#)

**Abstract:** Work on a number of boron hydride anions and cations has been carried out using the unique features of flowing afterglow-selected ion flow tube (FA- SIFF) technology. Reaction of strong base with diborane has allowed the preparation of a number of anionic boron hydride clusters. Many of these including B<sub>2</sub>H<sub>3</sub><sup>-</sup> have been examined in terms of their reaction chemistry (FA- SIFF) and structure (ah initio computation). The fundamental thermodynamic property of gas phase acidity has been measured for several boron hydride species by reacting their corresponding conjugate base with a series of reference acids. Nevertheless, the boron hydride anions have proved to be surprisingly unreactive, particularly considering their low-valency. As a result, studies on simple boron hydride cations like BH<sub>2</sub><sup>+</sup> were undertaken. This cation is particularly specific in its reactions with D<sub>2</sub> and CH<sub>4</sub> in contrast to its periodic neighbor CH<sub>3</sub><sup>+</sup>. It reacts with D<sub>2</sub> to give predominantly BHD<sup>+</sup> and HE). The reaction potential surface for this and related reactions has been studied by ah initio methods. Electron structure computations have also been carried out in collaboration with Professor M. S. Gordon on various titanium and silicon hydride species. (AN)

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