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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 B₂H₃⁻ 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 BH₂⁺ were undertaken. This cation is particularly specific in its reactions with D₂ and CH₄ in contrast to its periodic neighbor CH₃⁺. It reacts with D₂ to give predominantly BHD⁺ 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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