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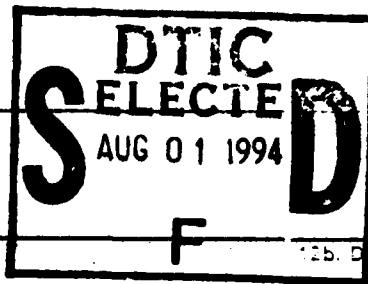
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13. ABSTRACT (Maximum 200 words)

Research has been done with pulsed-laser evaporated B, Be and Mg atoms and molecular hydrogen to explore the reactivities of these metals with He and to investigate infrared spectra of the product molecules in solid argon. The major products in the B/H<sub>2</sub> system were BH, (H<sub>2</sub>)(BH), BH<sub>3</sub>, (H<sub>2</sub>)(BH<sub>3</sub>) and B<sub>2</sub>H<sub>6</sub>. It is clear that molecular hydrogen is complexed to BH and BH<sub>3</sub> in these experiments.

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Research has been done with pulsed-laser evaporated B, Be and Mg atoms and molecular hydrogen to explore the reactivities of these metals with H<sub>2</sub> and to investigate infrared spectra of the product molecules in solid argon. The major products in the B/H<sub>2</sub> system were BH, (H<sub>2</sub>)(BH), BH<sub>3</sub>, (H<sub>2</sub>)(BH<sub>3</sub>) and B<sub>2</sub>H<sub>6</sub>. It is clear that molecular hydrogen is complexed to BH and BH<sub>3</sub> in these experiments.

In the case of Be and Mg, the major products were the linear dihydride H-M-H and the monohydride M-H molecules. This work obtained the first experimental evidence for H-Be-H, which is the textbook example of sp hybridized bonding.

Work is in progress on B+NH<sub>3</sub>. It appears that reaction occurs. Several new bands in the B-N stretching region are under analysis.

A paper has appeared on H-Be-H in *J. Am. Chem. Soc.* 1993, 115, 1211. Papers will appear in *J. Am. Chem Soc.* 1994 on BH and in *J. Phys. Chem.* 1994 on H-Mg-H.

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