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Investigation of Zirconium-Catalyzed Hydrogen Release from Amine-Boranes

Amine-boranes contain a high weight percent of hydrogen, which has prompted interest in these molecules for the storage of hydrogen as a clean fuel. Amine-boranes liberate hydrogen upon heating, yet for practical use, a catalyst is required. The catalyzed release of hydrogen from amine-boranes and phosphine-boranes has been investigated using formally d^0 triamidoamine-supported zirconium complexes. Hydrogen liberation was observed at temperatures as low as 40 °C, and model and isotopically labeled complexes have been isolated and characterized. The reaction chemistry of these and related zirconium complexes will also be discussed.