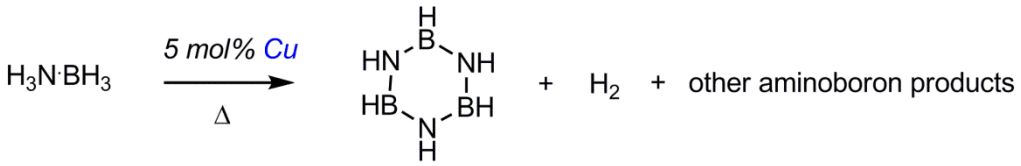
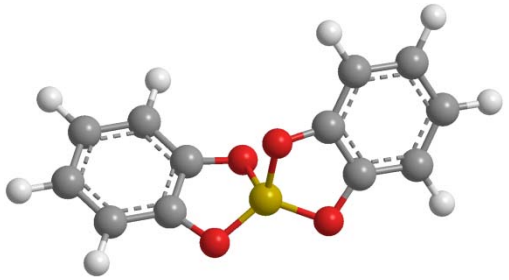
Copper Zwitterions for the Generation of Hydrogen

Stephen A. Westcott, Mount Allison University

We have begun to develop novel zwitterionic copper complexes containing unique arylspiroboronate ester ligands for their potential to act as catalysts for the dehydrogenation of ammonia-borane. Initial work with a bulky spiroboronate ester derived from 3,5-di-tert-butylcatechol shows that the formation of cationic species are favored. These compounds are active precatalysts for the gerneration of hydrogen using ammonia-borane (Scheme 1). We are presenting looking at using other catechol derivatives as well as other metal complexes for their catalytic and bioactive properties. We have shown that novel iridium arylspiroboronate ester complexes can be used as precatalysts for the addition of pinacolborane to vinyl arenes.



Scheme 1. Copper catalyzed dehydrogenation of ammonia-borane.



[1] (a) Invited Paper 'Synthesis and molecular structure of a novel barium arylspiroboronate ester' Halcovitch, N. A.; Geier, M. J.; Vogels, C. M.; Decken, A.; Westcott, S. A.* Cent. Eur. J. Chem. 2011, 9, 386-390. (b) 'Cationic ruthenium complexes with an arylspiroborate counterion derived from 3,5-di-tert-butylcatechol' Melanson, J. A.; Lee, G. M.; Vogels, C. M.; Decken, A.; Westcott, S. A.* Med. J. Chem. 2011, 2, 56-63. (c) Synthesis, characterization and antifungal studies of arylspiroborate esters derived from 4-nitrocatechol' Mosseler, J. A.; Melanson, J. A.; Bowes, E. G.; Lee, G. M.; Vogels, C. M.; Decken, A.; Westcott, S. A.* J. Mol. Struct. 2011, 1002, 24-27. (d) 'Iridium phosphane complexes containing arylspiroboronate esters for the hydroboration of alkenes' Lee, G. M.; Vogels, C. M.; Decken, A.; Westcott, S. A.* Eur. J. Inorg. Chem. 2011, 2433-2438. (underlined names refer to undergraduate researchers)