

Sterically Congested Boranes for Frustrated Lewis Pairs

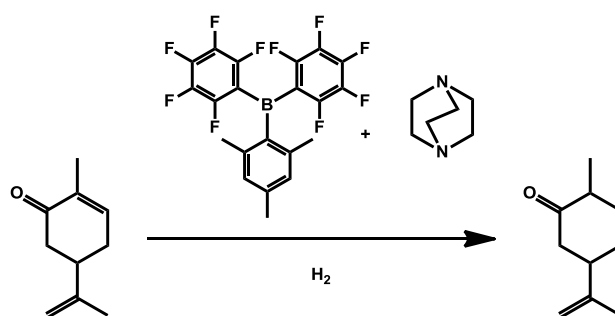
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Metal-free catalysis is one of the most developing topics in chemistry. Recently, the group of Stephan has introduced the concept of Frustrated Lewis Pair (FLP), which seems to be a promising tool in the activation of small molecules, such as hydrogen.¹ A Frustrated Lewis pair consists of a Lewis acid and a Lewis base that do not form a stable dative complex due to steric congestion; nevertheless, weak intermolecular forces are able to hold together the counterparts as a “frustrated complex”.²

The most common Lewis acid that is used for the FLP-based activation of hydrogen is tris(pentafluorophenyl)borane. Despite its availability, the application of this borane is limited in the field of Frustrated Lewis Pairs due to its low functional group tolerance. Because of the strong Lewis acidity and the steric accessibility of this boron compound, only bulky substrates were suitable for hydrogenation. We have previously shown that by increasing the steric hindrance around the boron atom it is possible to achieve higher functional group tolerance.³ Using bis(pentafluorophenyl)-mesitylborane and 1,4-diazabicyclo[2.2.2]octane, we could selectively hydrogenate the C=N double bond of imine derivatives and quinolines having olefinic or alkoxy functional groups.

Based on the principle of *size exclusion*, we have started to design and synthesize new boranes that are sterically more crowded. We now present the synthesis of some new boron compounds that are promising prototypes of new catalysts.



Hydrogenation of carvone using Frustrated Lewis Pairs

1. G. C. Welch, R. R. San Juan, J. D. Masuda, D.W. Stephan, *Science* **2006**, *314*, 1124 – 1126.; D. W. Stephan, G. Erker, *Angew. Chem. Int. Ed.* **2010**, *49*, 46 – 76.
2. T. A. Rokob, A. Hamza, A. Stirling, T. Soós, I. Pápai, *Angew. Chem. Int. Ed.* **2008**, *47*, 2435–2438.
3. G. Erős, H. Mehdi, I. Pápai, T. A. Rokob, P. Király, G. Tárkányi, T. Soós, *Angew. Chem. Int. Ed.* **2010**, *49*, 6556–6563.; Erős, G.; Nagy, K.; Mehdi, H.; Pápai, I.; Nagy, P.; Király, P.; Tárkányi, G.; Soós, T.; *Chem. Eur. J.*, **2012**, *18*, 574–585.