

Frustrated Lewis Pair Chemistry: Principles and Some Recent Results

Frontiers in Catalysis Science and Engineering Seminar Series

Presented by...

Prof. Dr. Gerhard Erker

- Universität Münster
- Organisch-Chemisches Institut
- Germany



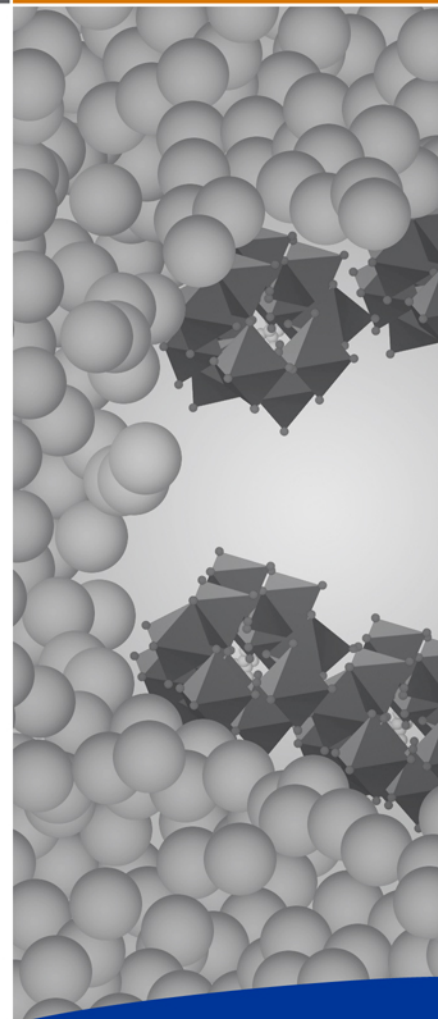
Abstract

Frustrated Lewis Pairs (FLPs) are comprised of pairs of Lewis acids and Lewis bases that avoid neutralizing strong adduct formation by having sterically bulky substituents attached or by electronic means. The simultaneous presence of active Lewis acids and bases in solution provides the opportunity to find new cooperative reactions to take place with a variety of added substrates.

Some general features of frustrated Lewis pair chemistry shall be discussed. Most characteristic of FLP behavior is metal-free heterolytic dihydrogen splitting and utilization of this property for the development of metal-free catalytic hydrogenation processes. Consequently, several examples shall be presented and discussed. This will be followed by the description and discussion of several newly found reaction types. These involve reactions of borane carbonyls at intramolecular frustrated Lewis pair templates and the reactions of the resulting formylborane type products. Frustrated Lewis pairs have opened a novel entry to methylene phosphonium systems, the phosphorus analogues of the ubiquitous iminium ions. This has led us to a development of a phosphorus relative of the Stork reaction. Eventually, a similarity between coordination of small organic donor molecules to typical transition metal complexes and to the bifunctional intramolecular main group element phosphane/borane frustrated Lewis pairs is discussed. This has led to the development of persistent FLP-NO radical chemistry, systems that have become very easily available by the reaction of various intramolecular vicinal P/B FLPs with nitric oxide (NO). Some features of the chemistry of these new persistent nitroxide radicals will be presented.

<http://www.uni-muenster.de/Chemie.oc/erker/en/research.html>

Hosted by: Tom Autrey
Admin: Brooke Lanigan



Aug. 7, 2014

EMSL Auditorium

10:00 am