

Frustrated Lewis Pair Chemistry: Searching for New Reactions

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The attachment of very bulky substituents at the core atoms of Lewis acids and bases can effectively hinder their neutralizing Lewis pair formation. The resulting “frustrated Lewis pairs (FLPs)” then offer the possibility to undergo cooperative reactions with added substrates. This has led to some interesting developments in main group element chemistry. Some FLP reactions show a remote similarity to metal coordination chemistry. FLP chemistry has led to the disclosure of a variety of new reactivities. Metal-free activation of dihydrogen is a prominent example. This and several other examples of FLP behavior will be presented and discussed in this lecture. This will involve some new reactions of carbon monoxide and of nitric oxide. Some FLP reduction chemistry of carbon monoxide will be discussed in some detail. FLP chemistry has offered a new entry to “phospha-iminium” systems and the development of a “phospha-Stork chemistry”. New polyfunctional FLP examples will be presented, which have led to some rather unusual and unprecedented chemical behavior, including some specific cycloaddition reactions. Eventually, a very simple borane catalyzed reaction maybe discussed as well.

Some recent reviews:

- Stephan, D. W., Erker, G. "Frustrated Lewis Pair Chemistry: Development and Perspectives", *Angew. Chem. Int. Ed.* **2015**, *54*, 6400-6441.
- Frustrated Lewis Pairs I, *Uncovering and Understanding*, Erker, G., Stephan, D. W. (Eds), *Top. Curr. Chem.* 332, Springer, Heidelberg **2013**.
- Frustrated Lewis Pairs II, *Expanding the Scope*, Erker, G., Stephan, D. W. (Eds), *Top. Curr. Chem.* 334, Springer, Heidelberg **2013**.
- Frustrated Lewis Pair Chemistry: Searching for New Reactions», Kehr, G., Erker, G. *Chem. Rec.* **2017**, *17*, 803-815.