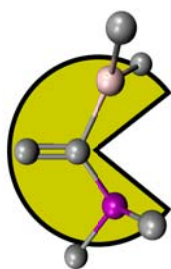


C. Appelt, H. Westenberg, F. Bertini, A.W. Ehlers, J.C. Slootweg, K. Lammertsma, and W. Uhl, *Geminal phosphorus/aluminum-based frustrated Lewis pairs: C-H versus C≡C activation and CO₂ fixation*, **Angew. Chem. Int. Ed.** 50, 3925-3928 (2011).

Koop Lammertsma, Chris Slootweg en Andreas Ehlers in Angewandte Chemie

Using a so-called Frustrated Lewis Pair compound with a Lewis basic phosphorus site and a Lewis acidic aluminum site, the Lammertsma group together with the Uhl group of the University of Münster were able to ‘catch’ acetylenes and carbon dioxide even reversibly.

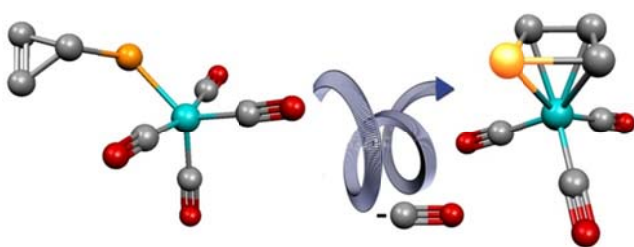


Catch it! the Lammertsma and Uhl groups call it. The ‘Pac-Man’ like molecules they report upon are Frustrated Lewis Pairs (LFPs) that grab acetylenes and carbon dioxide even reversibly. Based on acetylene chemistry, the authors synthesized the novel LFP molecules with phosphorus and aluminum centers. In this work they uniquely demonstrate that a simple alanes can be used as Lewis acid site instead of the tedious and expensive polyfluorinated boranes that are commonly employed in LFPs. For the performance of the novel class of LFPs the proximity of the alane to the phosphorus unit is crucial. Comprehensive DFT theoretical calculations revealed the mechanistic pathways for activating of the terminal acetylenes and the grabbing of carbon dioxide, which are sensitive to both the electronic nature and the steric requirements of the LFP substituents. Tuning of these parameters may contribute to find the optimal LFP for catching atmospheric carbon dioxide and converting it to organic products.

V. Lyaskovskyy, N. Elders, A.W. Ehlers, M. Lutz, J. C. Slootweg, and K. Lammertsma, *Remarkable metal-complexed phosphorus analogues of the cyclopropenylcarbene-cyclobutadiene rearrangement*, **J. Am. Chem. Soc.** 133, 9704 – 9707 (2011).

Koop Lammertsma, Chris Slootweg en Andreas Ehlers in the Journal of the American Chemical Society

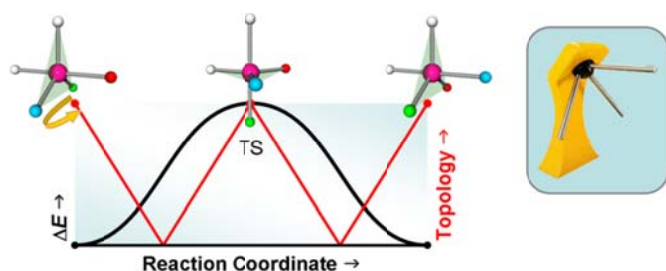
Lammertsma and coworkers showed a P-substituted cyclopropene complexed with a metal carbonyl group to rearrange to the novel P-cyclobutadiene ligand in a ‘piano stool’ compound. The reaction is a unique sequence of events occurring in a remarkable high selectivity. T



The Lammertsma group reported in the Journal of the American Chemical Society that in situ-generated metal carbonyl-complexed cyclopropenylphosphinidenes undergo a sequence of structural changes leading to the phosphorus analogue of Pettit’s (η^4 -cyclobutadiene)iron tricarbonyl complex. Using theoretical calculations they showed that this process involves multiple valence isomers along the reaction pathway with elimination of one molecule of carbon monoxide. The phosphacyclobutadiene ligand is new to the piano stool compounds and adds to the arsenal of valuable ligands for coordination chemistry.

Erik P. A. Couzijn, J. Chris Slootweg, Andreas W. Ehlers, and Koop Lammertsma, *Stereomutation of Pentavalent Compounds: Validating the Berry Pseudorotation, Redressing Ugi's Turnstile Rotation, and Revealing the Two- and Three-Arm Turnstiles*, **J. Am. Chem. Soc.** 132, 18127–18140 (2010). Christina Moberg, *Stereomutation in Trigonal-Bipyramidal Systems: A Unified Picture*, **Angew. Chem. Int. Ed.** 50, in press (2011), DOI: 10.1002/anie.201103375

Pentacoordination. Berry pseudorotation and Ugi turnstile redressed by the group of Lammertsma in the **Journal of the American Chemical Society**; this work was highlighted in **Angewandte Chemie**.



Pentavalent compounds are subject to intramolecular substituent permutation. These are common in phosphoranes, silicates, and transition-metal complexes and known as the Berry pseudorotation and Turnstile rotation. Starting from experimentally characterized silicates, the intrinsic reaction coordinate for stereomutations are analyzed by DFT theory using internal coordinates. The resulting three principle mechanisms differ from current interpretations in that all are based on the Berry pseudorotation. The far-reaching consequences for mechanistic studies on penta-coordinate systems are addressed. It was demonstrated that the Berry pseudorotation and the Ugi turnstile mechanisms are equivalent and that the Berry pseudorotation is *the* fundamental mechanism by which interconversion of pentavalent isomers proceed.

This work was very recently highlighted by Christina Moberg in *Angewandte Chemie* (DOI: 10.1002/anie.201103375), underlining the importance of the findings of the Lammertsma group.