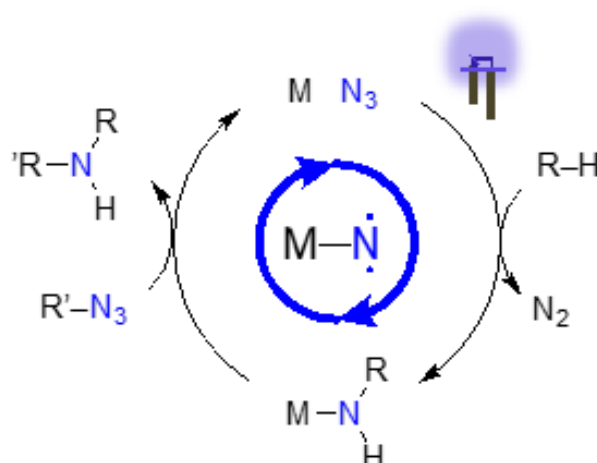


From Metallonitrenes and -carbenes to Catalytic Nitrogen Atom Transfer

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Molecular transition metal nitrides ($M\equiv N$) are only scarcely utilized in chemical synthesis.¹ Over the last years, we have developed access to transition metal formal nitrido species with predominant nitridyl ($M=N$) and metallonitrene ($M-N$) character,^{2,3} as well as the neighboring heavier metallopnictinidenes ($M-Pn$) and -carbenes ($M-C-R$).^{4,5} The subvalent Pn/C-diradical ligands undergo unprecedented C-H and C=C bond activation reactions,^{2c,6} and gave rise to the first example for catalytic nitrogen atom transfer (Figure).^{2b}

In this seminar, the synthesis, chemical bonding, and reactivity of closed-shell complexes with subvalent triplet ligands E^- ($E = N, P, As, Sb, C-R$) will be presented. Their prospect for group transfer catalysis will be discussed.



References

- ¹ M. N. Cosio, D. C. Powers, *Nat. Rev. Chem.* **2023**, 7, 42.
- ² (a) M. G. Scheibel, B. Askevold, F. Heinemann, E. I. Reijerse, B. de Bruin, S. Schneider, *Nature Chem.* **2012**, 4, 552.
- ³ (a) J. Sun, J. Abbeneth, H. Verplancke, M. Diefenbach, B. de Bruin, D. Hunger, C. Würtele, J. van Slageren, M. C. Holthausen, S. Schneider, *Nature Chem.* **2020**, 12, 1054. (b) T. Schmidt-Räntsch, H. Verplancke, J. N. Lienert, S. Demeshko, M. Otte, G. P. van Trieste, K. A. Reid, J. H. Reibenspies, D. C. Powers, M. C. Holthausen, S. Schneider, *Angew. Chem. Int. Ed.* **2022**, 61, e202115626. (c) L. I. Domenianni, M. Bauer, T. Schmidt-Räntsch, J. Lindner, S. Schneider, P. Vöhringer, *Angew. Chem. Int. Ed.* **2023**, 62, e202309618.
- ⁴ (a) J. Sun, H. Verplancke, Julia I. Schweizer, M. Diefenbach, C. Würtele, M. Otte, I. Tkach, C. Herwig, C. Limberg, S. Demeshko, M. C. Holthausen, S. Schneider, *Chem* **2021**, 7, 1952. (b) M. Neben, N. Wegerich, T. Al Said, R. Thompson, S. Demeshko, K. Dollberg, I. Tkach, G. van Trieste, H. Verplancke, C. von Haenisch, M. Holthausen, D. Powers, A. Schnegg, S. Schneider, *J. Am. Chem. Soc.* **2025**, accepted.
- ⁵ Z.-J. Lv, K. A. Eisenlohr, R. Naumann, T. Reuter, H. Verplancke, S. Demeshko, R. Herbst-Irmer, K. Heinze, M. C. Holthausen, S. Schneider, *Nature Chem.* **2024**, 16, 1788.
- ⁶ T. Schmidt-Räntsch, H. Verplancke, A. Kehl, J. Sun, M. Bennati, M. Holthausen, S. Schneider, *JACS Au* **2024**, 4, 3421.