DINITROGEN ACTIVATION BY A URANIUM HYDRIDE COMPLEX

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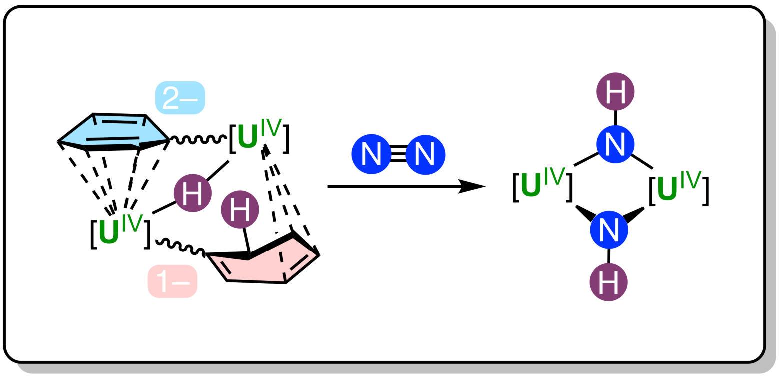
Dinitrogen cleavage and hydrogenation by metal hydride complexes are relevant to both enzymatic and industrial dinitrogen fixation [1], but remain limited to a few examples.

Here, we report the cleavage and functionalization of N_2 mediated by a pincer ligand-supported diuranium(IV) hydride complex $[\{(\text{Dipp-NON})\text{U}^{\text{IV}}(\eta^4\text{-HDipp})\}(\mu\text{-H})\{(\eta^6\text{-Dipp})\text{U}^{\text{IV}}(\text{NON-Dipp})\}]$ [2]. In this complex, a total of six electrons and two protons are stored in two flanking arms of the bis(anilido)xanthene scaffolds and in the bridging hydride, which are stabilized by two uranium(IV) centers. The reaction of this complex with dinitrogen results in concomitant N_2 cleavage and functionalization, affording the bis-imido complex $[\{(\text{Dipp}_2\text{-NON})\text{U}^{\text{IV}}\}_2(\mu\text{-NH})_2]$, via an unprecedented cooperative metal−ligand pathway.



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[1] Jia, H. P.; Quadrelli, E. A. *Chem. Soc. Rev.* **2014**, *43*, 547−564.

[2] Pang, Y.; Batov, M. S.; Rajeshkumar, T.; Zivkovic, I.; Scopelliti, R.; Maron, L.; Mazzanti, M. *J. Am. Chem. Soc.* **2026**, DOI: 10.1021/jacs.6c00478.