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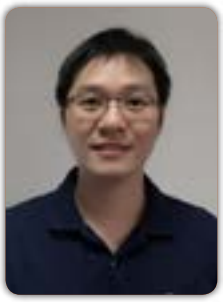

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Visible light-driven generation of N-radicals and reaction design

Because of the high bond dissociation free energy of the N-H bond, the generation of N-radicals from N-H bonds and their synthetic potential are still underexplored. Recently, the visible-light photocatalysis has emerged as an attractive tool for the catalytic formation of N-centered radicals, but the pre-incorporation of a photolabile groups at the nitrogen atom limited the substrate scope. Recently, we have developed a visible light-induced oxidative deprotonation electron transfer (ODET) strategy for direct conversion of the N-H bonds of hydrazones into the corresponding N-centered radicals. Employing this strategy, we have successfully developed a series of N-radical-based hydroamination, oxyamination of alkenes, as well as cascade reactions. DFT calculations and control experiments were also performed to investigate the reaction mechanisms and regioselectivity. Further details will be presented in the talk.

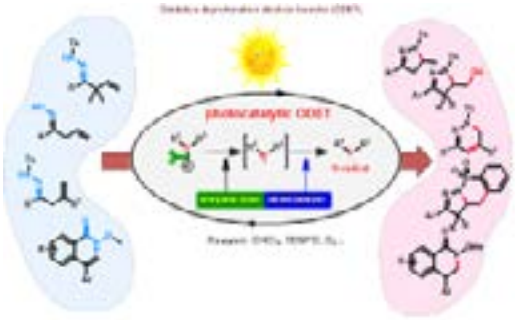

Figure 1: Visible-light-driven generation and reactions of N-centered radicals

Recent publications

1. Chen, J.-R. Hu, X.-Q. Lu, L.-Q. Xiao, W.-J. Chem. Soc. Rev. 2016, 45, 2044-2056.
2. Hu, X.-Q.; Chen, J.-R.; Wei, Q.; Liu, F.-L.; Deng, Q.-H.; Beauchemin, A. M.; Xiao, W.-J. Angew. Chem. Int. Ed. 2014, 53, 12163-12167.
3. Hu, X.-Q.; Qi, X.; Chen, J.-R.*; Zhao, Q.-Q.; Wei, Q.; Lan, Y.; Xiao, W.-J. Nat. Commun. 2016, 7, 11188.
4. Hu, X.-Q.; Chen, J.; Chen, J.-R.; Yan, D.-M.; Xiao, W.-J. Chem. Eur. J. 2016, 22, 14141-14146.
5. Zhao, Q.-Q.; Chen, J.; Yan, D.-M.; Chen, J.-R.; Xiao, W.-J. Org. Lett. 2017, 19, 3620-3623.

Biography

Jia-Rong Chen earned his PhD from Central China Normal University (CCNU) under the supervision of Professor Wen-Jing Xiao (2009). After holding a position at CCNU (2009−2010), he worked as a Humboldt Postdoctoral Fellow with Professor Carsten Bolm at the RWTH Aachen University (2011−2012). In 2012, he returned to CCNU and began his independent career an Associate Professor. In July of 2016, he was promoted to Professor of Chemistry. His research interests include asymmetric catalysis, photoredox catalysis and nitrogen radical chemistry. He has received honors and awards including the National Science Fund for Excellent Young Scholars of China (2016), Distinguished Young Scholar of Hubei Province (2016), Thieme Chemistry Journals Award (2015), and Alexander von Humboldt research fellowship (2010)..

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