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Isothiouronium radicals: a novel class of photogenerated radical organocatalysts

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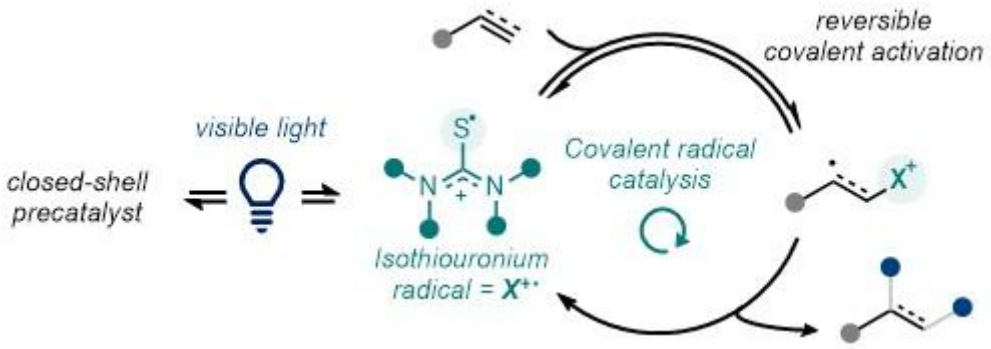
The use of open-shell organic compounds as molecular catalysts offers an underexplored approach to expanding activation modes in organocatalysis. One such strategy, involving the initiation of radical cascades through the transient addition of a catalytic free radical to a C–C multiple bond, is known as covalent radical catalysis and constitutes an efficient strategy to quickly increase molecular complexity. In this area, neutral thiyl radicals have long been a benchmark. However, their limited structural diversity, rapid deactivation via dimerization, and the need for radical initiators or UV irradiation to generate them in situ have hindered the practical development of covalent radical catalysis, which has remained in its early stages for over 30 years.[1]

Our group has recently made a significant advancement by identifying isothiouronium radicals, a new class of cationic sulfur-centered radicals, as highly efficient radical organocatalysts.[2] We have developed complementary strategies to generate these reactive species under visible light irradiation from various stable closed-shell precatalysts[3] and are actively exploring applications in photo-induced radical covalent catalysis.[4]



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[3] K.-L. Song, R. Meyrelles, G. Pilet, B. Maryasin, M. Médebielle, J. Merad, *Angew. Chem. Int. Ed.* **2025**, *64*, e202419751.
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