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Novel synthetic methods in halogen-atom transfer and nitroarene reactivity

Giovedì 24 Novembre 2022, Aula A Nasini, ore 15.30

In this presentation I will discuss two recent research lines from my group focused on the development and understanding of halogen-atom transfer and excited nitroarene reactivity.

1) Halogen-atom transfer (XAT). Organic halides are valuable building blocks for the generation of alkyl and aryl radicals. However, their applications in photoredox catalysis can be difficult owing to their very negative reduction potentials. I will present our recent work focused on the use of α -aminoalkyl radicals as XAT mediators for the homolytic activation of alkyl iodides and bromides and their application in synthesis.^{1,2} Furthermore, I will discuss a non-canonical activation mode in XAT that eludes both kinetic and thermodynamic control.³

2) Photoexcited nitroarenes. Nitroaromatics are widely available feedstocks that are routinely used for the preparation of anilines. I will present our most recent work that demonstrates how these species can be used, upon blue light irradiation, to promote the ozonolysis-style cleave of olefins⁴ and also, in a skeletal editing logic, to allow preparation of complex and highly functionalised azepanes.⁵

For selected references, see:

1. T. Constantin, M. Zanini, A. Regni, N. S. Shikh, F. Julia and D. Leonori *Science* 2020, 367, 1021.
2. B. Gorski, A.-L. Barthelemy, J. J. Douglas, F. Julia and D. Leonori *Nat. Catal.* 2021, 4, 623. *J. Am. Chem. Soc.* 2021, 143, 14806.
3. T. Constantin, B. Gorski, M. Tilby, J. Llaveria, H. Zipse, S. Lakhdar and D. Leonori, unpublished results.
4. A. Ruffoni, C. Hampton, M. Simonetti and D. Leonori, unpublished results.
5. R. Mykura, R. Sanchez, V. Duong, J. Llaveria, A. Ruffoni and D. Leonori, unpublished results.

La presenza della S. V. sarà molto gradita.

Prof. Michele Maggini
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