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### Mechanistic studies of radical reactions: Improving efficiency of chain processes

Radical chemistry is a powerful and versatile tool for synthetic chemistry. Single electron transfer processes offer complimentary reactivity to two-electron or polar reactions, due to the open shell reactive species that undergo chemical reaction through otherwise difficult to access pathways. The use of radical chemistry in synthesis has become more prevalent in part due to the application of transition metal coordination compounds as photocatalysts for generating organic radicals. Visible light mediated photoredox catalysis has given rise to a wide variety of new synthetic processes including late stage functionalisation, carbon-carbon and carbon-heteroatom bond formation reactions.<sup>[1]</sup>

In some instances, such as that below, excellent but unexpected chemoselectivity has been achieved (below).<sup>[2]</sup> This approach could potentially be used to selectively modify unprotected carbohydrates, if the reaction could be better understood.



Ultimately, to design and execute new complex photoredox catalytic reactions, it is critical to elucidate the photochemical mechanism of reaction.<sup>[3]</sup> In particular, it is important to determine the origin of chemo- and regio-selectivity of photoredox reactions, which this talk will seek to address.

### References

- [1] M. H. Shaw, J. Twilton, D. W. C. MacMillan, *J. Org. Chem.* **2016**, *81*, 6898-6926.
- [2] I. C. S. Wan, M. D. Witte, A. J. Minnaard, *Chem. Commun.* **2017**, *53*, 4926-4929.
- [3] M. Marchini, G. Bergamini, P. G. Cozzi, P. Ceroni, V. Balzani, *Angew. Chem. Int. Ed.* **2017**, *56*, 12820-12821.