α-Aryl Ketones – Easy Accessed by Photoredox Catalysis Mediated by Visible Light

Elisabeth Speckmeier, Clément Padié, Kirsten Zeitler

Institute of Organic Chemistry, University of Leipzig

e-mail: kzeitler@uni-leipzig.de

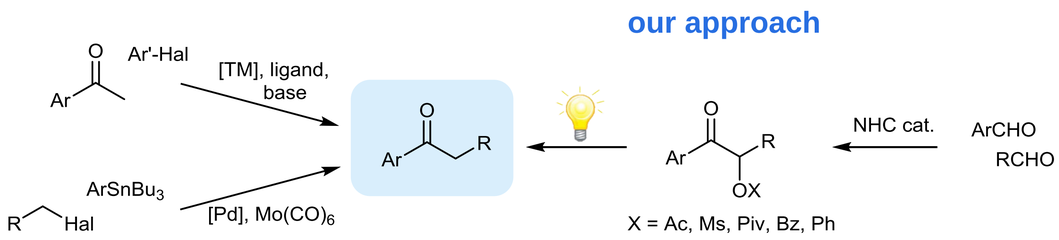
UNIVERSITÄT LEIPZIG

GRK 1626 Chemical Photocatalysis

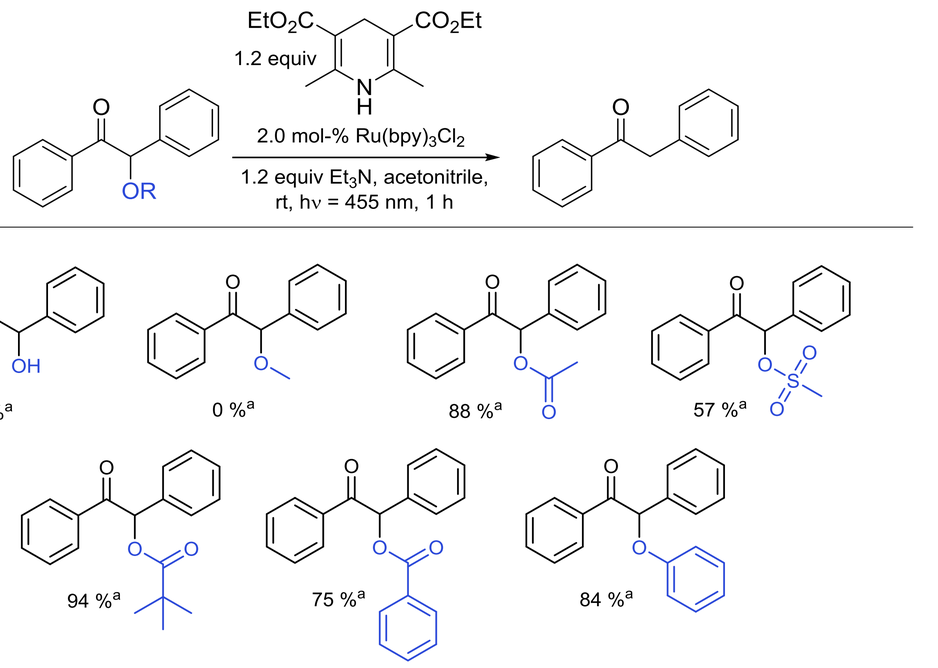
DFG

Aim of our Work

α-Aryl ketones are common pharmacophores and part of many natural products with known biological activity. They serve also as building blocks for important heterocycles, such as indoles, pyrazoles, oxazoles, imidazoles and isoflavones. In consequence the selective, mild and efficient preparation of these compounds is of great current interest.

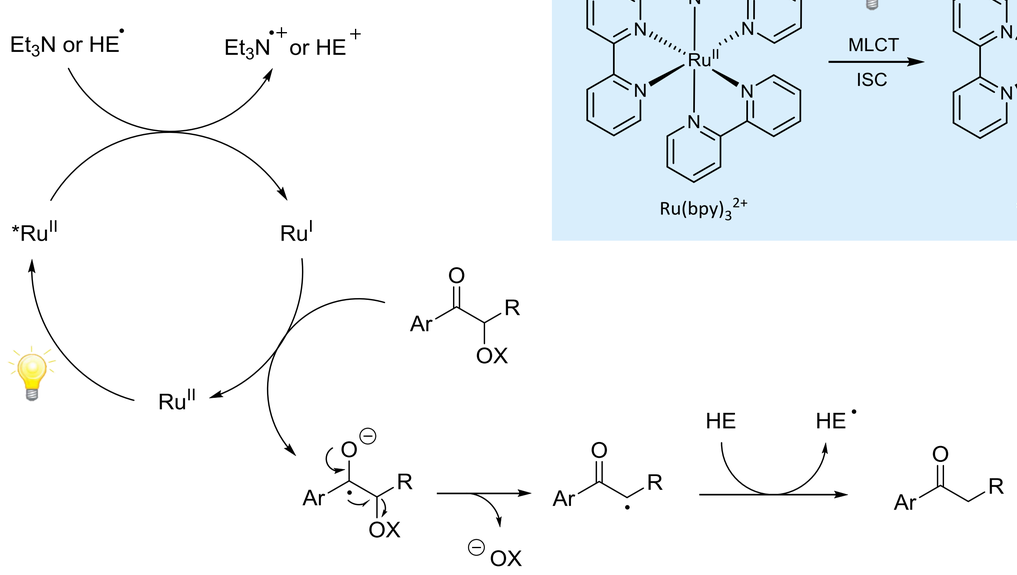


Different Leaving Groups

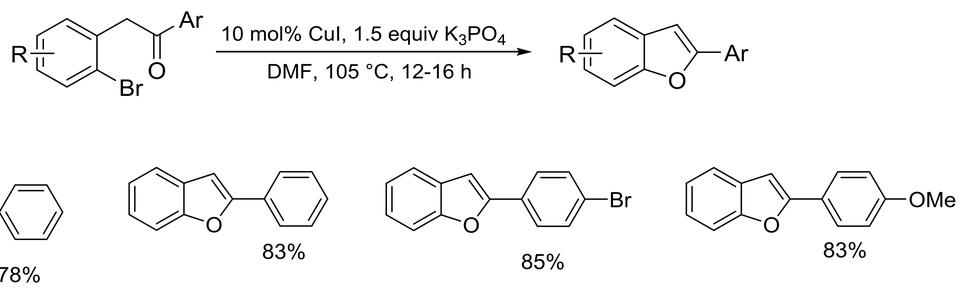


[a]isolated yield; Conditions: Benzoin (0.5 mmol), $Ru(bpy)_3Cl_2$ (2 mol%), Hantzsch ester (1.2 equiv), Et_3N (1.2 equiv), MeCN (3 ml).

Proposed Mechanism

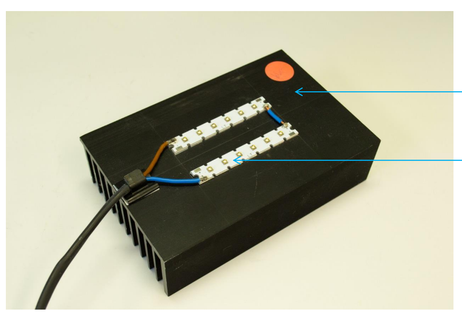


Synthesis of 2-Arylbenzofuranes(3)

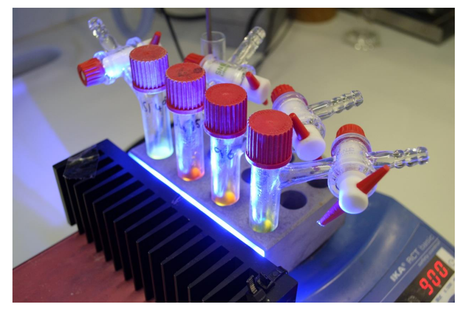


Setup for Photoredox Catalytic Reactions

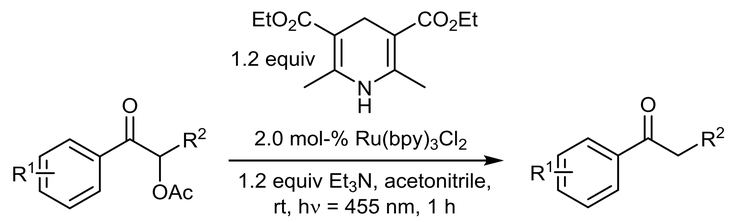
Irradiation at room temperature:

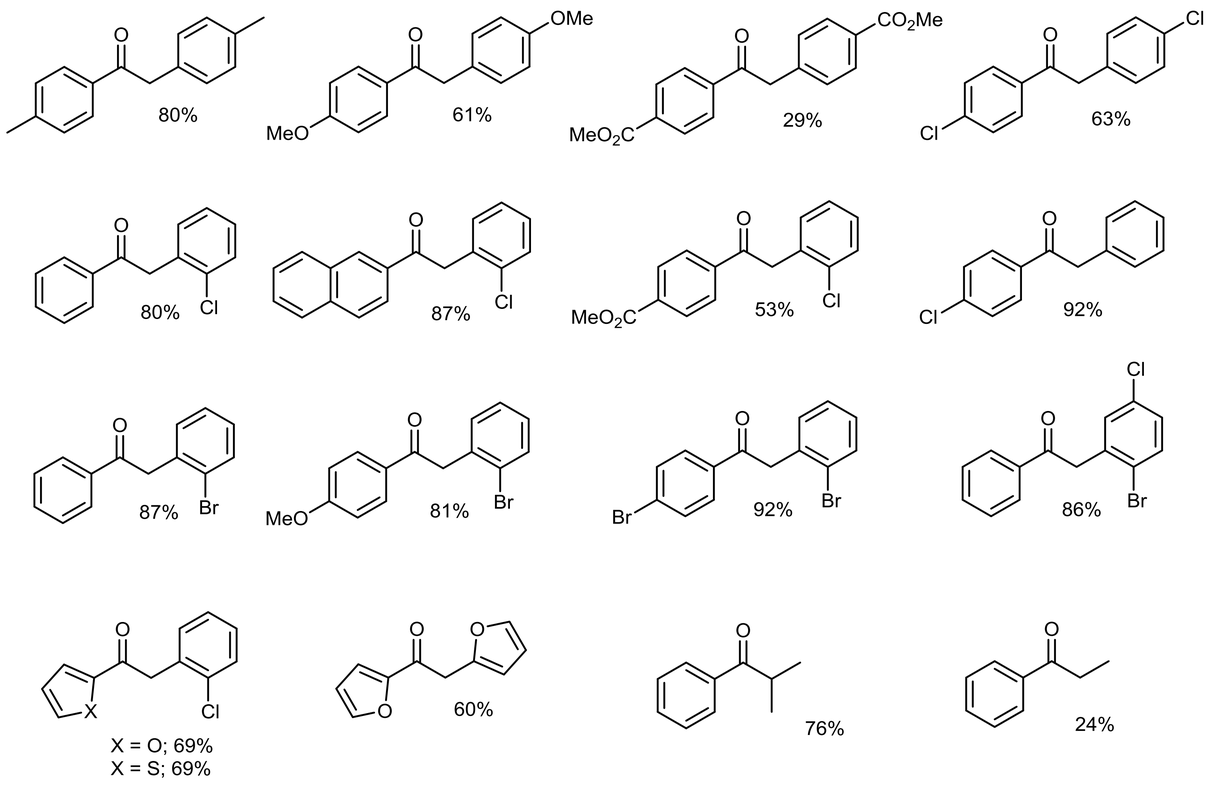


Irradiation with temperature control:



Substrate Scope





[a]isolated yield; Conditions: Benzoin (0.5 mmol), $Ru(bpy)_3Cl_2$ (2 mol%), Hantzsch ester (1.2 equiv), Et_3N (1.2 equiv), MeCN (3 mL).

(1) Speckmeier, E.; Padié, C., Zeitler, K. *Org. Lett*. **2015**, *17*, 4818.
(2) (a) Fox, J. M.; Huang, X.; Chieffi, A.; Buchwald, S. L. *J. Am. Chem. Soc*. **2000**, *122*, 1360. For recent reviews see: (b) Johannson, C. C. C.; Colacot, T. *J. Angew. Chem*., *Int. Ed*. **2010**, *49*, 676. (c) Burke, A. J.; Marques, C. S. *Catalytic Arylation Methods*; Wiley-VCH: Weinheim, **2015**; p 376.
(3) Chen, C.-y.; Dormer, P. G. *J. Org. Chem.* **2005,** *70*, 6964.
(4) For reviews on photoredox catalysis see: (a) Zeitler, K. *Angew. Chem. Int. Ed.* **2009**, *48*, 9785-9789. (b) Prier, C. K.; Rankic, D. A.; MacMillan, D. W. C. *Chem. Rev*. **2013**, *133*, 5322-5363. (c) Romero, N., A.; Nicewicz, D. A. **2016**, *Chem. Rev*., DOI: 10.1021/acs.chemrev.6b00057.

Printed by URZ Leipzig