

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

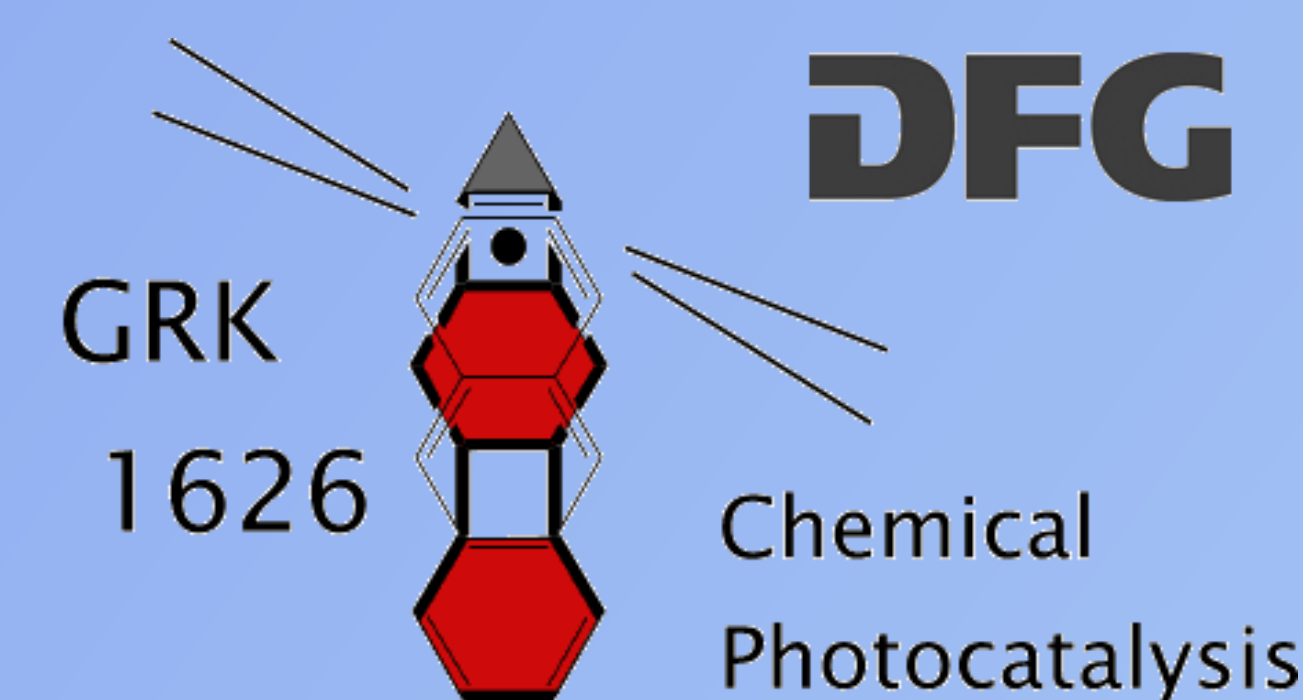


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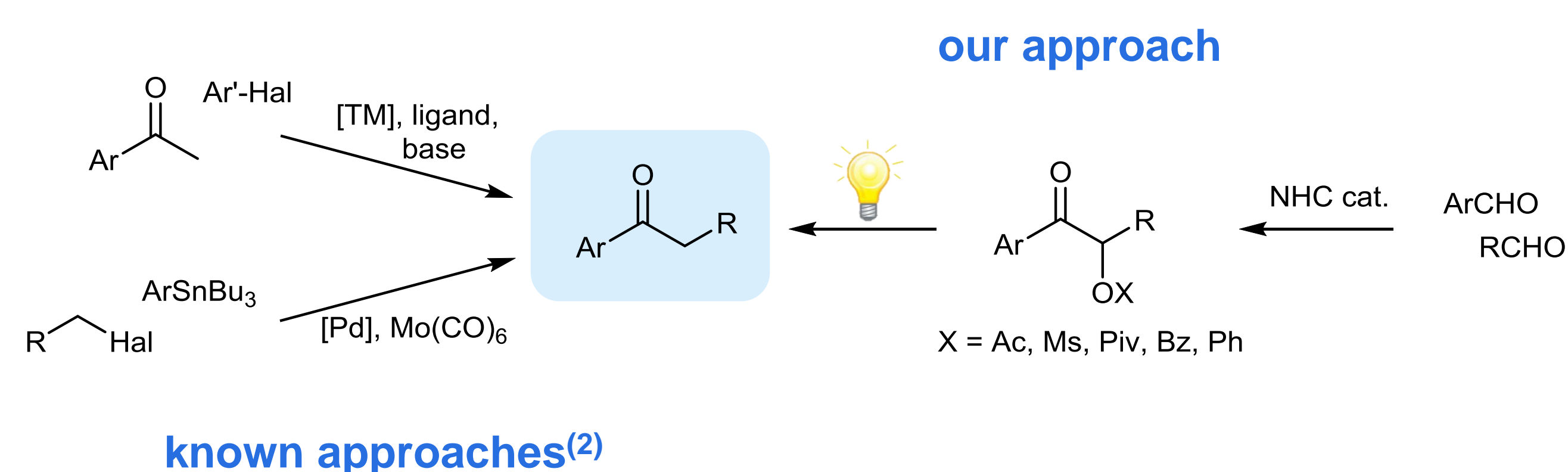
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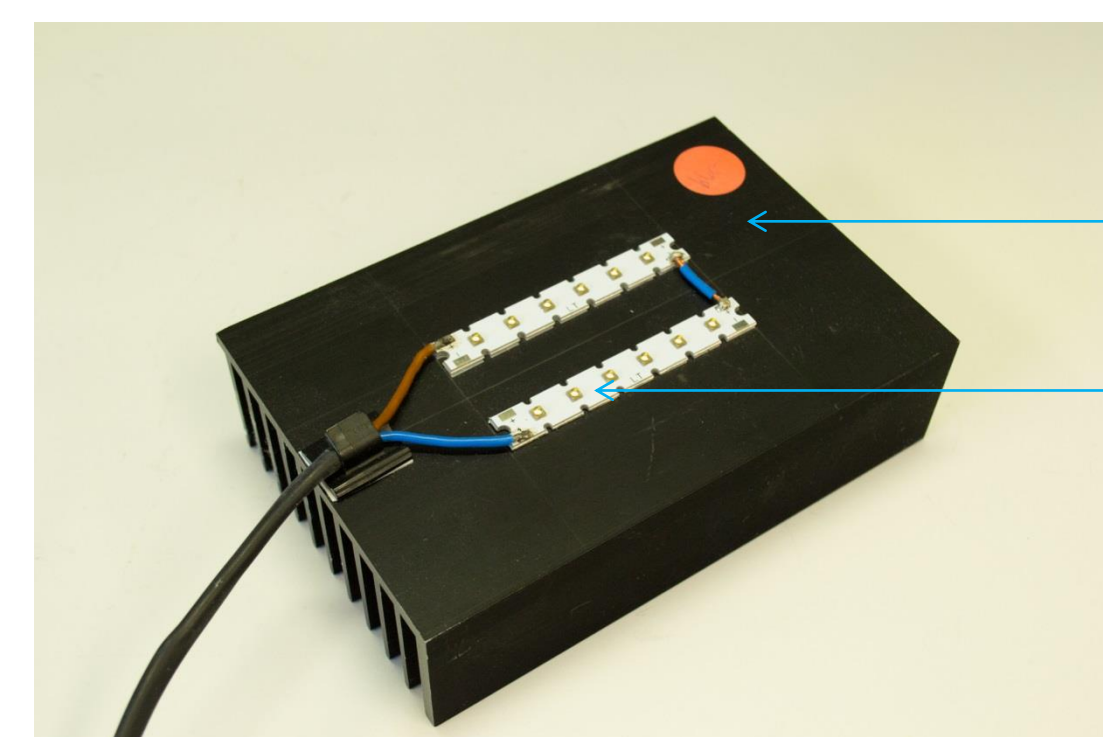
Aim of our Work

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.



Setup for Photoredox Catalytic Reactions

Irradiation at room temperature:

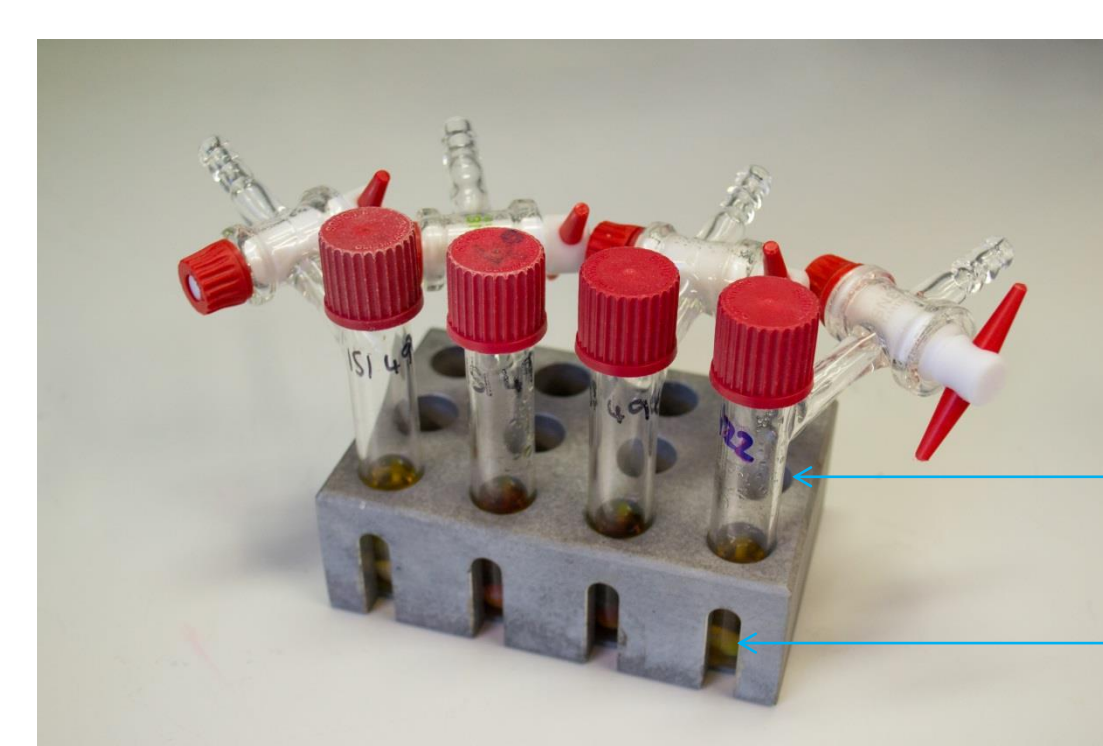


cooling sink

2 arrays with 6 LEDs (455 nm, 1 Watt, 145 lm per LED)

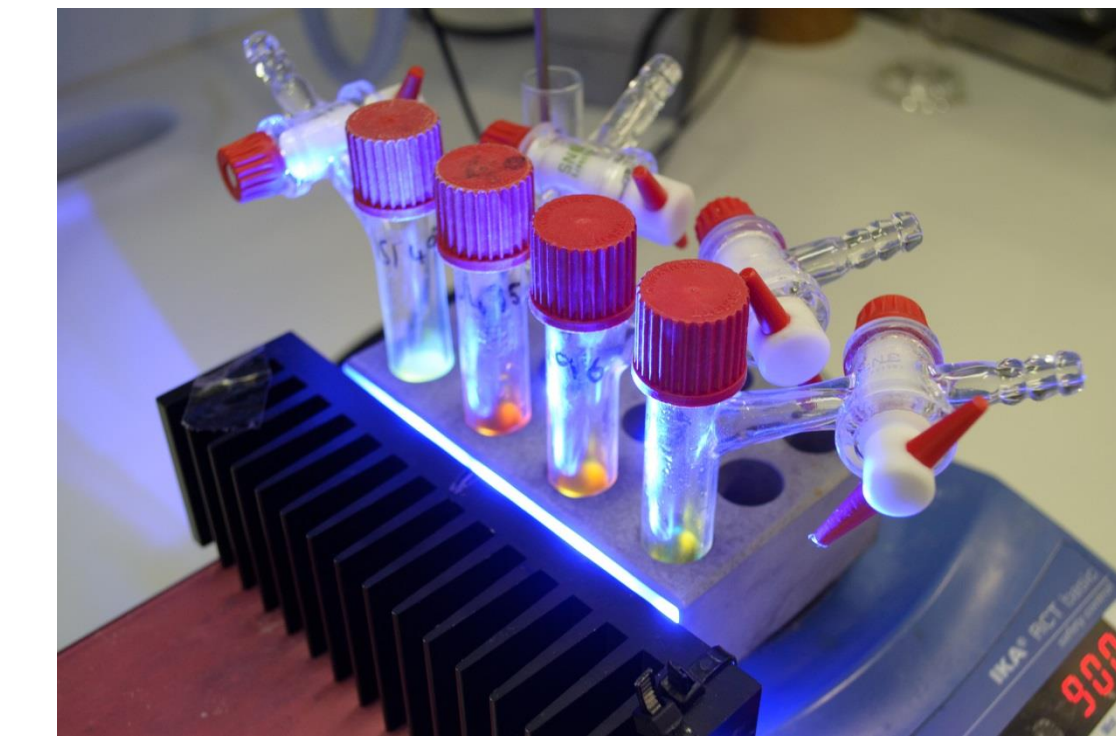


Irradiation with temperature control:

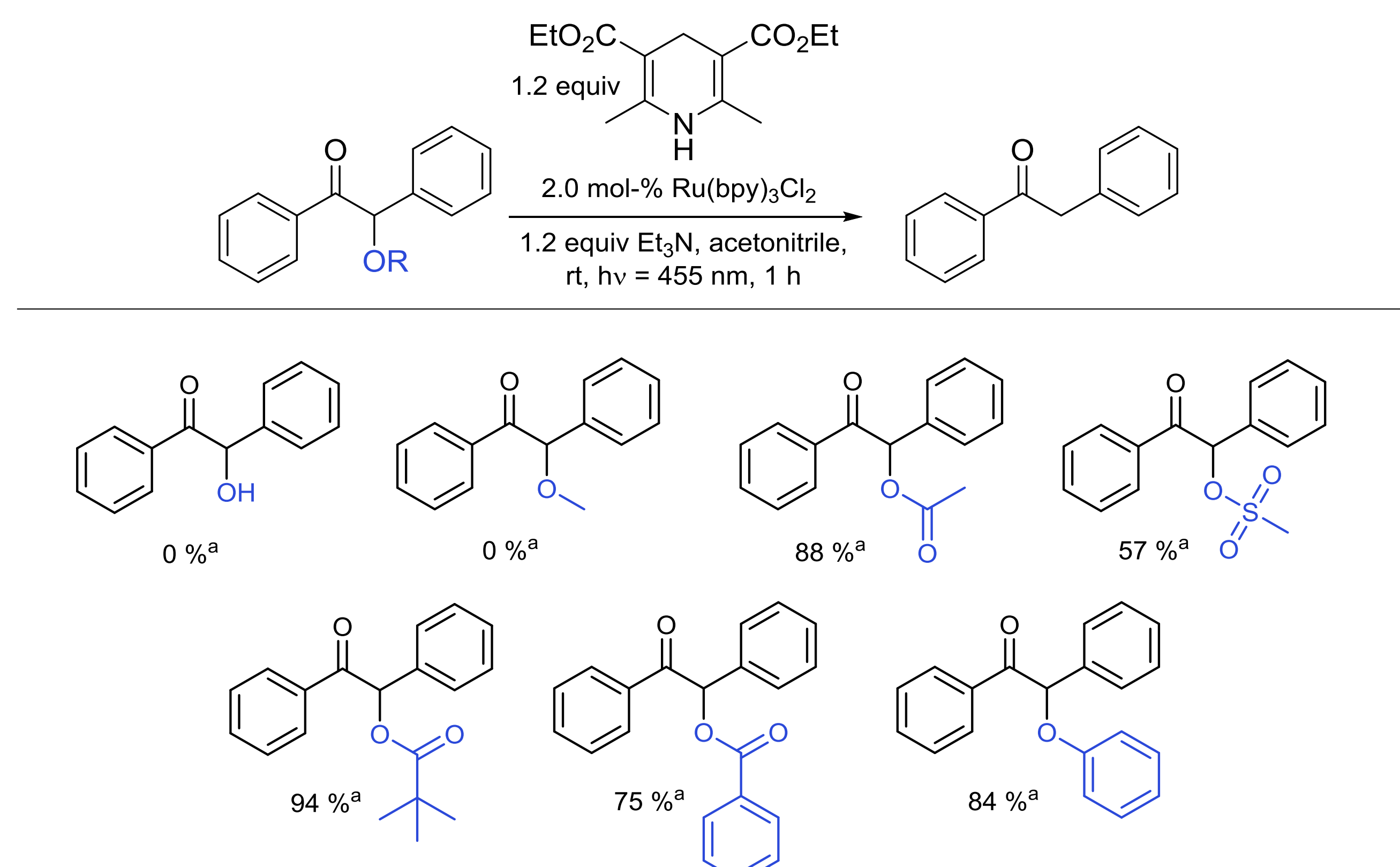


aluminum block for heating and cooling

window for irradiation

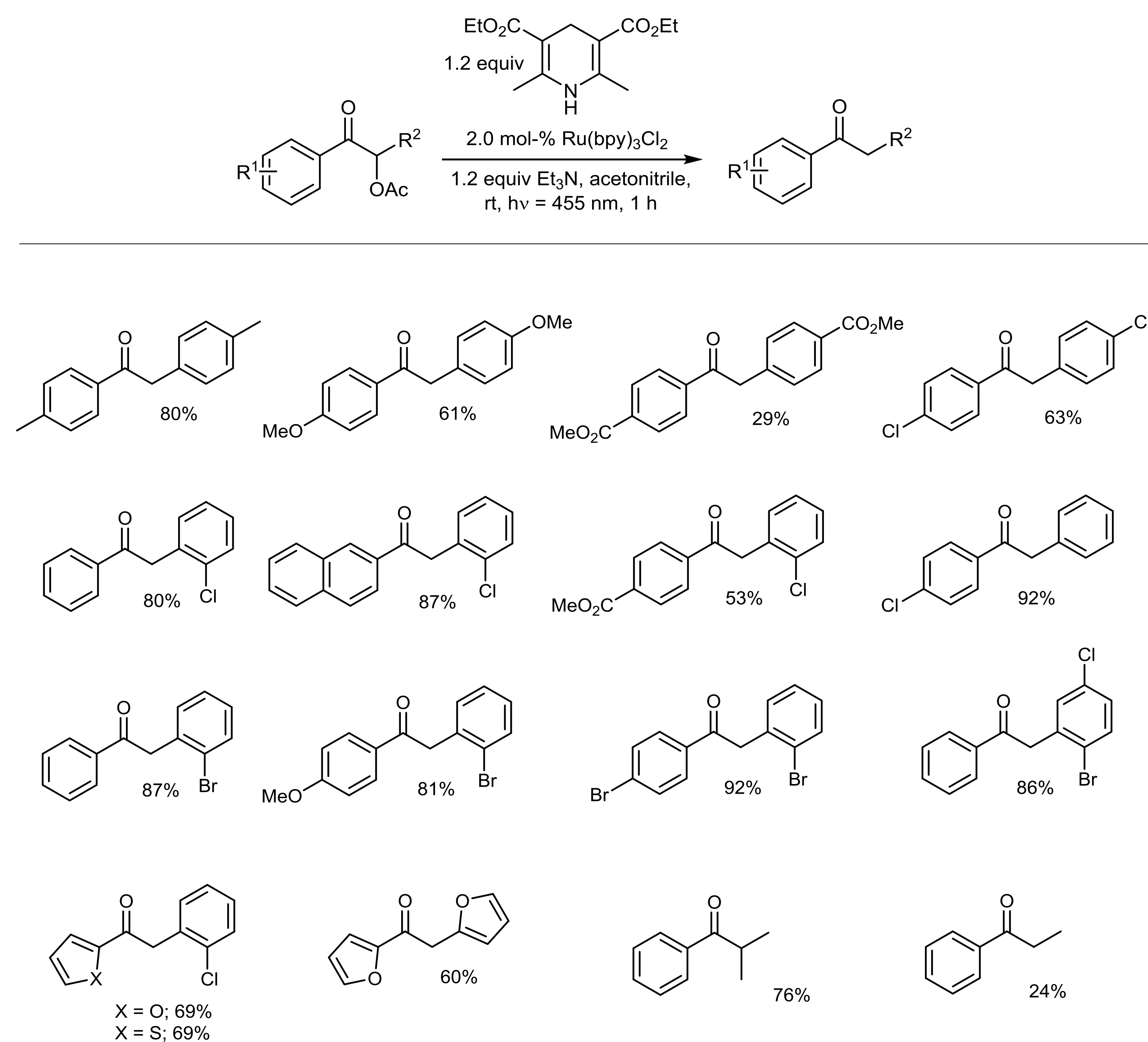


Different Leaving Groups



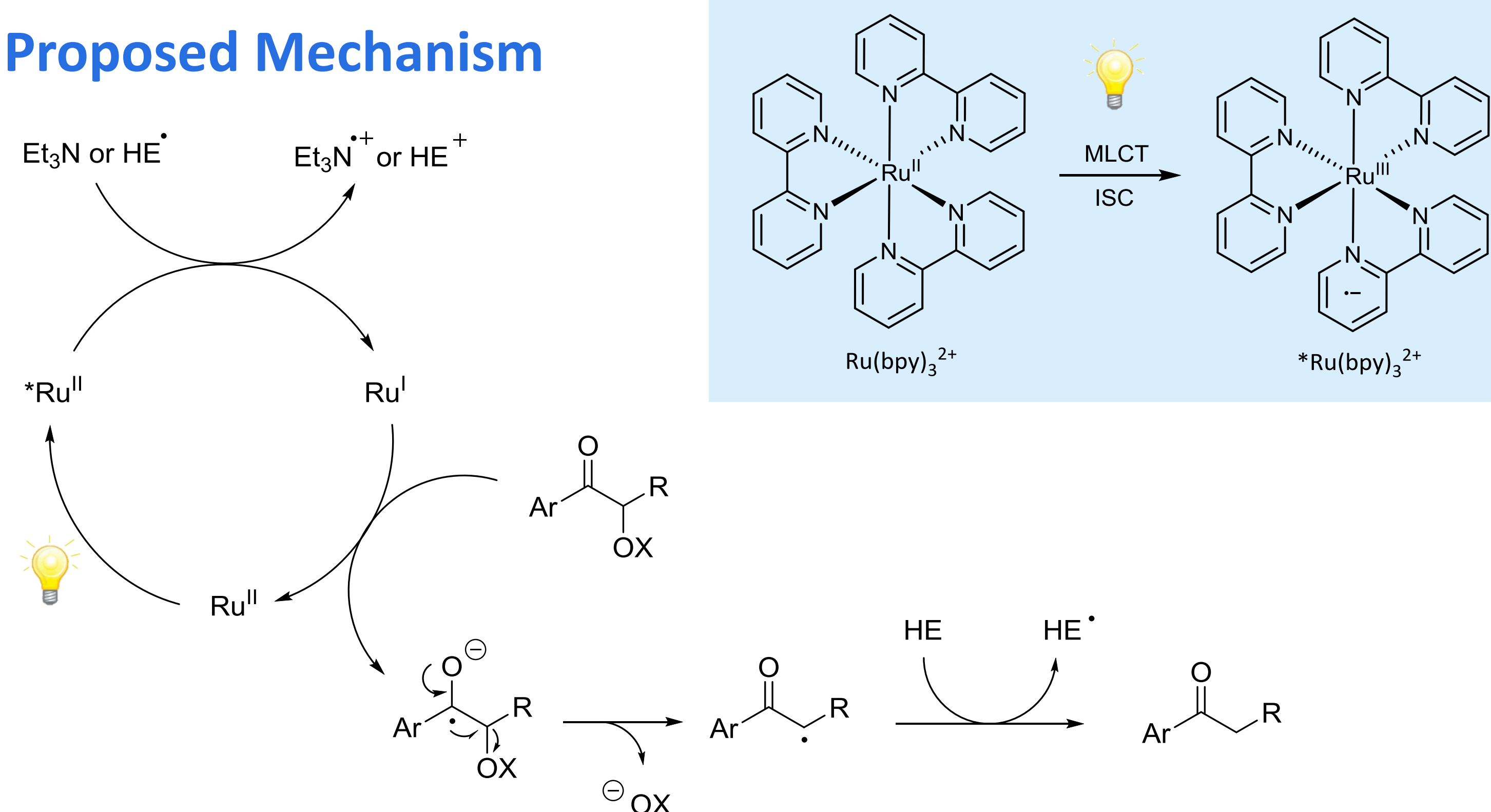
^aisolated yield; Conditions: Benzoin (0.5 mmol), Ru(bpy)₃Cl₂ (2 mol%), Hantzsch ester (1.2 equiv), Et₃N (1.2 equiv), MeCN (3 ml).

Substrate Scope

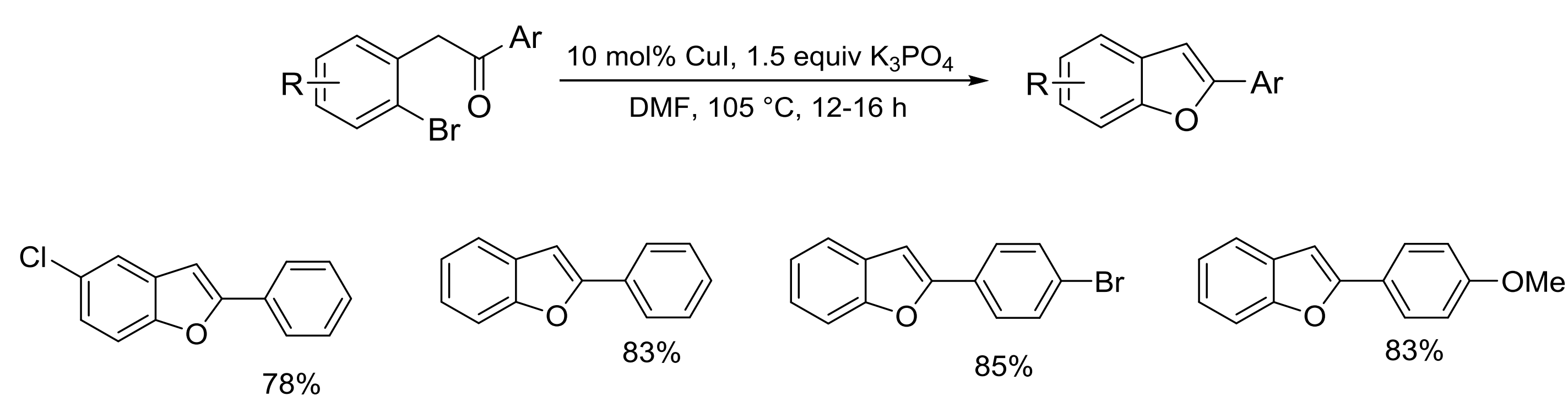


^aisolated yield; Conditions: Benzoin (0.5 mmol), Ru(bpy)₃Cl₂ (2 mol%), Hantzsch ester (1.2 equiv), Et₃N (1.2 equiv), MeCN (3 ml).

Proposed Mechanism



Synthesis of 2-Arylbenzofuranes⁽³⁾



- (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) Johansson, 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.

