

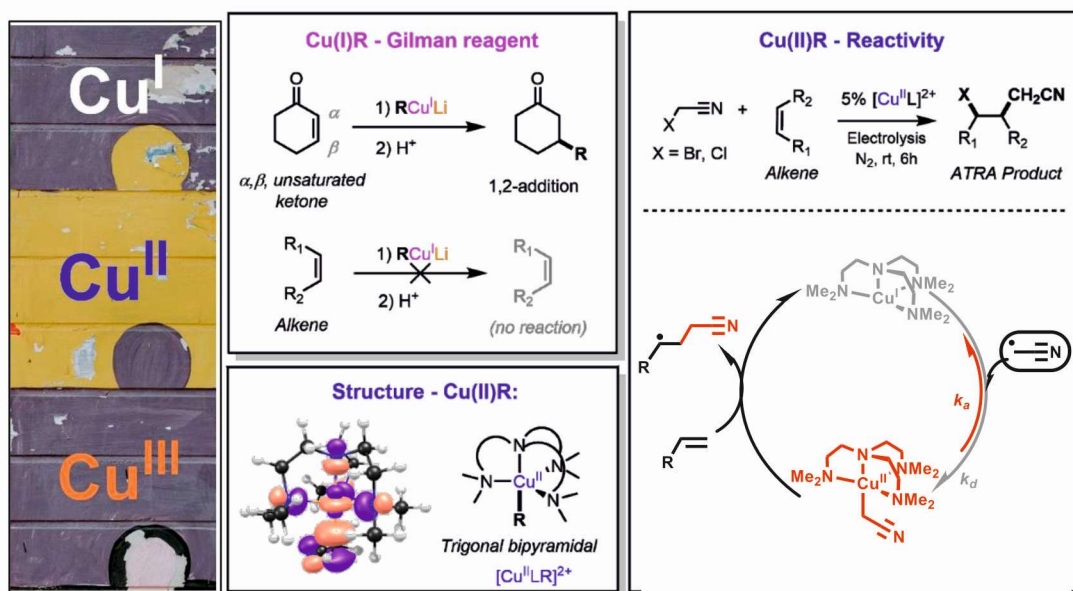
# Organocopper(II) Complexes: New Catalysts for Electrochemical Radical Additions

Miguel A. Gonzalez, Chuyi Su, Craig M. Williams,\* Paul V. Bernhardt\*

School of Chemistry and Molecular Biosciences, University of Queensland, Brisbane, 4072, Australia

Email: [p.bernhardt@uq.edu.au](mailto:p.bernhardt@uq.edu.au), [c.williams3@uq.edu.au](mailto:c.williams3@uq.edu.au)

Aryl copper(I) complexes are a staple in nucleophilic reactions, with notorious examples such as simple organometallic species ( $\text{RCu}$  and  $\text{R}_2\text{Cu}^-$ , where  $\text{R}$  = alkyl carbanion) and organocuprates ( $\text{R}_2\text{CuM}$ , where  $\text{M} = \text{Li}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Zn}^{2+}$ ). Organocopper(III) complexes are also well-studied reaction intermediates that can undergo in cross-coupling reactions with different anionic nucleophiles.<sup>[1]</sup> Aryl copper(II) complexes, however, are a missing link in the field of organocopper chemistry.<sup>[2]</sup> A quick search for organocopper(II) species will reveal a scarce amount of structures being elucidated: most of these consisting of  $\text{Cu}^{\text{II}}\text{-C}$  bonds stabilized by ligand effects that prevent bond cleavage. Having said that, two main questions surrounding organocuprous chemistry are still unanswered: “Are they stable enough to be generated?” and “If so, do they have a real synthetic utility?” In the past, our group directly observed the formation of these unique species after forming them in situ through electrochemical techniques.<sup>[3]</sup> Recently, we have devised a strategy to wholly isolate these organocopper(II) species in bulk solution.<sup>[4]</sup> In this presentation, we aim to solve this reactivity question while also exploring their roles as effective electrocatalysts.



## References

- [1] N. Yoshikai, E. Nakamura, *Chem. Rev.*, **2012**, 112 (4), 2339-2372.  
 [2] Q. Zhang, T. Wang, X. Zhang, S. Tong, Y. Wu, M. Wang. *J. Am. Chem. Soc.*, **2019**, 141 (45), 18341-18348.  
 [3] T. J. Zerk; P. V. Bernhardt. *Inorg. Chem.*, **2017**, 56(10), 5784–5792.  
 [4] M. A. González; J. R. Harmer; P. V. Bernhardt. *Inorg. Chem.*, **2021**, 60(14), 10648–10655.