



## New carbyne transfer catalysis in organic chemistry

 **Timeline** | 06/2020 to 05/2023

 **ICIQ People** | [Marcos G. Suero Research Group](#)

 **Budget** | 145,200 €

 **Call** | Proyectos I+D - Excelencia 2019

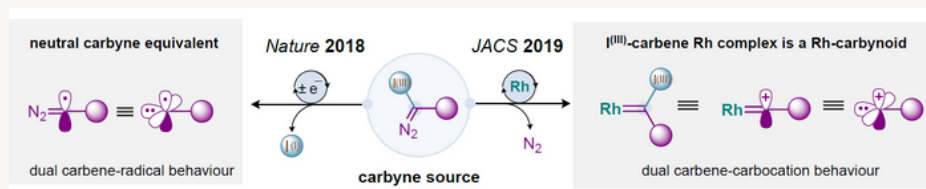
### SUMMARY

Over the last half century, the challenge of forming metal-carbyne complexes in a catalytic fashion have precluded the discovery of chemical reactions enabling catalytic monovalent carbon transfer process. This proposal aims to circumvent this problem by developing a general platform for the catalytic generation of metal-carbynoid species and to study their reactivity towards organic matter.

The art of chemical synthesis and reaction discovery relies on logic-guided thought processes that often involve the transfer of trivalent and divalent carbon-based reactive species to organic matter. However, over the last century, the transfer of monovalent carbons or carbynes has been largely unexplored in chemical synthesis. The synthetic potential and conceptual advance of carbynes or equivalent reactive forms have been underappreciated by the synthetic community, despite (a) their unique reactivity rules (b) their ability to form three new carbon bonds; and (c) their new logic to design, build and modify organic matter. The class of bond-forming processes and dual carbene/carbocation behavior of the metal-carbynoids is suggesting that this reactivity platform is far-reaching and may lead to a broad spectrum of new chemical reactions and applications. Synthetic chemists have missed the opportunity of using metal-carbynoids as cationic carbyne synthons. The innate ability of these species to form three new bonds suggest that methodologies involving metalcarbynoids, may have the ability to streamline chemical synthesis and to reach previously unattainable chemical space in the pharmaceutical sector (among others), enabling the potential discovery of medicines to treat disease faster than ever before. Successful development of this proposal will fulfill my group's ambition of becoming an internationally recognized research group at the cutting-edge of chemical research in carbyne transfer catalysis. It is also in our national and European benefit to train our scientists at the frontier of knowledge, what will provide new solutions to existing and future problems that our modern society demands. Finally, this project will allow the European research to stand at the frontier in the field of late-stage functionalization based on a new carbyne transfer platform. The project will contribute to the excellence of the European Research Area and it can also contribute to its competitiveness by introducing such novel synthetic methods of potential interest for the pharmaceutical, agrochemical and small-molecule material sectors.



*Long-standing problem: generation of metal-carbynes for catalytic carbyne transfer*



*New carbyne transfer strategies for organic synthesis developed in the Suero Laboratory*