

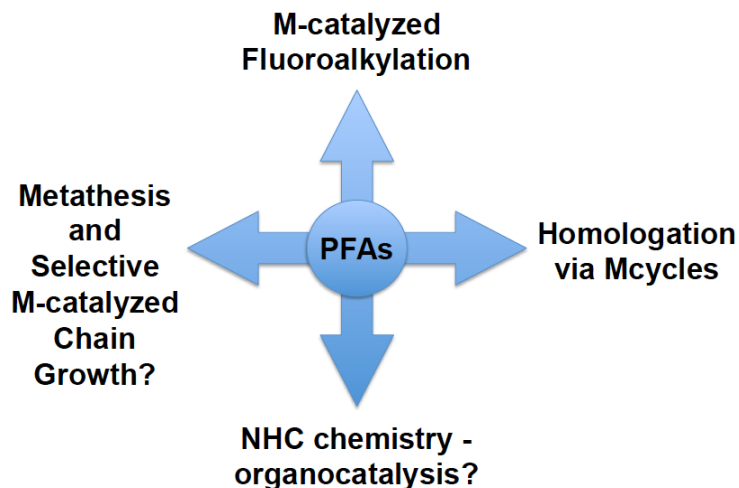
Base-Metal Complex-Catalyzed Transformations of Fluoroalkenes

3:45-5:00 Wednesday, January 15th, PSB 160

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The transition to more eco-friendly small-chain fluorinated groups is leading to a resurgence in the synthesis and reactivity of polyfluoroalkenes (PFAs).¹ In this presentation we demonstrate the utility of base-metal complexes for C-C bond formation using PFAs.² In one example, nucleophilic cobalt- and nickel-fluorocarbene complexes have been prepared and shown to react with fluoroalkenes to afford both stable metallacyclobutanes³ and metathesis products via different mechanisms, as validated by DFT.⁴ Use of low-coordinate Ni N-heterocyclic carbene (NHC) complexes led to a catalyzed hydro-defluorodimerization of CH₂=CF₂ using silanes.⁵ Employing Stryker's "CuH(PPh₃)" reagent and a variety of ancillary ligands with silanes allows for multiple selective hydrodefluorinations of PFAs to a variety of new hydrofluoroalkenes.⁶ Finally, in preliminary attempts at organocatalysis, reactions of PFAs with NHCs afford new 'push-pull' alkenes that are easily converted to polyfluorovinyl imidazolium salts that enable facile formation of C-E bonds (E = C, N, O, S).⁷



References

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- ⁶ Andrella, N. O.; Baker, R. T. PCT filed 2017; published as WO 2018/039795; US patent filed Feb. 2019. Andrella, N. O.; Xu, N.; Gabidullin, B. M.; Ehm, C.; Baker, R. T. *J. Am. Chem. Soc.* **2019**, 141, 11506-11521.
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