Understanding organic electrosynthesis under mechanochemical conditions

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Abstract

Organic electrosynthesis has emerged as a green enabling methodology to perform chemical transformations over the past few years. [1] Organic electrochemistry has demonstrated several essential advantages, including replacing dangerous and toxic oxidizing or reducing agents with electrons as the reagent, the digital accessibility to a wide range of potentials, and the real-time monitoring of reactions. Although these essential attributes render organic electrosynthesis an environmentally benign methodology, some challenges limit the efficiency of organic electrosynthesis, including the choice of proper solvent for the dissolution of organic species and the organic electrolyte, the diffusion of the organic substrate to the electrodes. Mechanochemistry has emerged as a green, environmentally benign methodology to perform chemical transformations under minimal solvent conditions with efficient mixing. This report studies the merge between electrochemistry and mechanochemistry as a tool to overcome the limitation of traditional organic electrosynthesis. Herein we report the design of mechano-electrochemical cell to perform electrochemical transformations under mechanochemical conditions. We monitored the current passing through the mechano-electrochemical cell while milling with the digital tuning of the potential of the electrodes using a connected potentiostat.

References

1. Ruttkies, C.; Schymanski, E. L.; Strehmel, N.; Hollender, J.; Neumann, S.; Williams, A. J.; Krauss, M. Supporting non-target identification by adding hydrogen deuterium exchange MS/MS capabilities to MetFrag. *Anal Bioanal Chem* **2019***, 411*, 4683-4700.