Electrifying Organic Synthesis

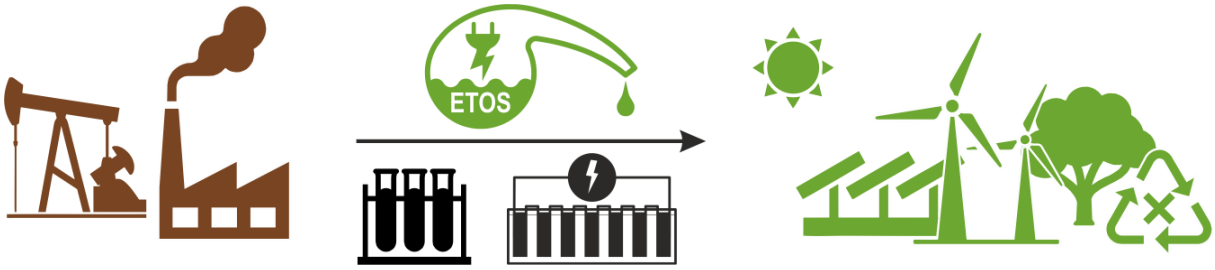
Siegfried R. Waldvogel, Max-Planck Institute for Chemical Energy Conversion, Department of Electrosynthesis, 45470 Mülheim/Germany

siegfried.waldvogel@cec.mpg.de - www.cec.mpg.de/en/research/electrosynthesis/prof-dr-siegfried-waldvogel

The direct use of electrochemistry for the generation of reactive intermediates can have major advantages towards conventional synthetic strategies. Compared to the action other sustainable approaches such as photochemistry, the overall energetic balance is superior and allows easily scalable conversions. Less or no reagent waste is generated and new reaction pathways are accessible. In order to exploit the electricity driven conversions for synthetic purposes and to install unique selectivity two modern approaches will be outlined:

1) For reaching larger scale in electrochemical conversions, the formation of high-performance oxidizers is an option. By the given versatility a broad applicability is targeted.
2) Several unique molecular entities require for their installation large amounts of reagents, when using electrochemical tools this can be achieved almost waste-free. This is of particular interest when complex molecules are desired.

The working horse to identify suitable electrolytic conditions is the electrosynthetic screening approach. This strategy gives also rise to fast optimization and subsequent scale-up. For technical realization of electrosyntheses carbon electrodes play a crucial role ranging from diamond to highly isostatic graphite carbon allotropes.



Some references:

Angew. Chem. Int. Ed. **2023**, e202219217; *Eur. J. Org. Chem.* **2023**, e202300220; *Angew. Chem. Int. Ed.* **2023**, *62*, e202214820; *JACS Au* **2023**, *3*, 575; *Angew. Chem. Int. Ed.* **2023**, *62*, e202213630; *Science* **2021**, *371*, 507.