12th International Conference on
Chemistry Meeting
October 20-21, 2022 | Webinar
Volume: 13

Overcoming Limitations in Decarboxylative Arylation via Ag-Ni Electrocatalysis

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A useful protocol for achieving decarboxylative cross coupling (DCC) of redox-active esters (RAE, isolated or generated in situ) and halo(hetero)arenes is reported. This pragmatically focused study employs a unique Ag-Ni electrocatalytic platform to overcome numerous limitations that have plagued this strategically powerful transformation. In its optimized form coupling partners can be combined in a surprisingly simple way: open to the air, technical grade solvents, an inexpensive ligand and Ni source, substoichiometric $AgNO_3$, proceeding at room temperature in about 2 hours with a simple commercial potentiostat. Most importantly all of the results are placed into context by benchmarking with state-of-the-art methods. Applications are presented that simplify synthesis and rapidly enable access to challenging chemical space. Finally, adaptation to multiple scale regimes, ranging from parallel mg-based synthesis to decagram recirculating flow is presented.

Biography

As a medicinal chemist with experience in Neuroscience, I focus on using complex organic synthesis to develop and enhance the SAR of various scaffolds with the eventual goal of developing small molecule clinical candidates in the CNS field. I lead Biogen High throughput Parallel Medicinal Chemistry (PMC) synthesis platform - support projects teams from Hit ID to Lead Op discovery phase with the design, quick feasibility studies, and fast turn-around of focused matrix libraries. Establish internal capabilities to optimize standard library-type reaction conditions to support the above PMC efforts. In the meantime, I closely collaborate with project teams and computational chemists to develop PMC enable chemistry for CNS compound design and synthesis and cross-functionally with discovery biologists, quantitative biologists, and DMPK teams to achieve our goals.

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