SUSTAINABLE SYNTHESIS OF USEFUL BUILDING BLOCKS ENABLED BY ELECTROLYSIS IN CONTINUOUS-FLOW

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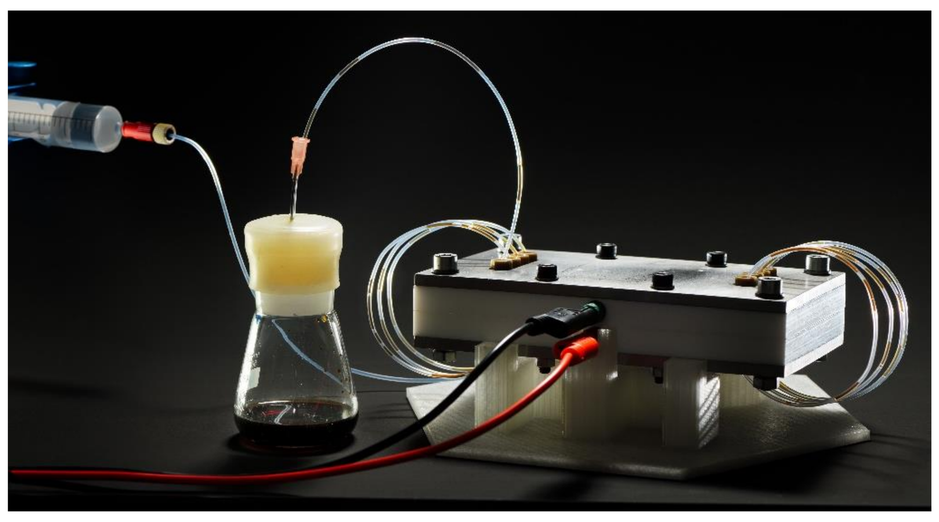
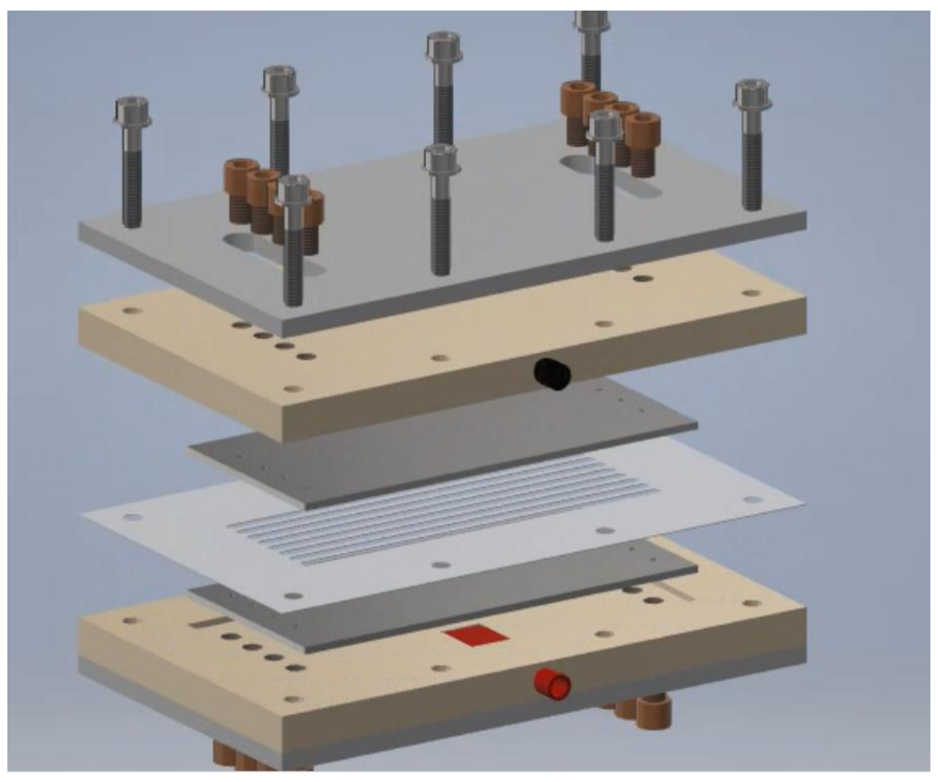
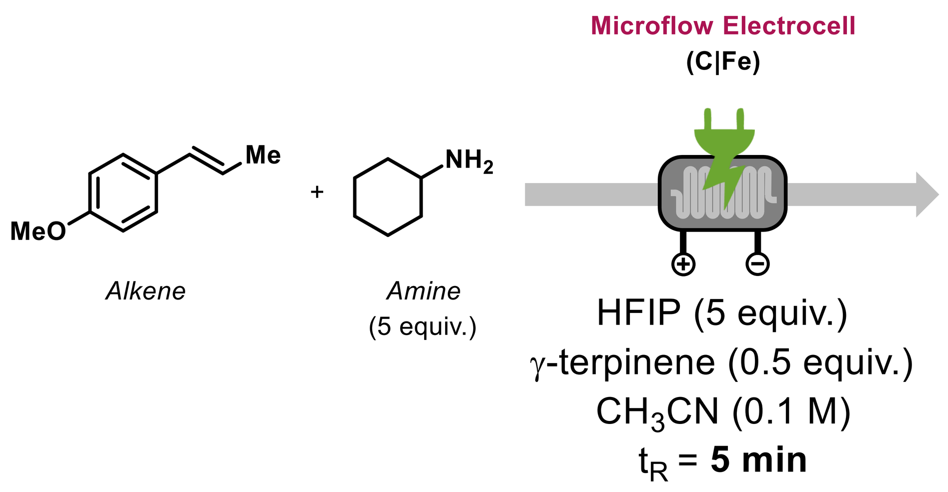
Synthetic electrochemistry gathered a significant attention over the last decade since it is a great alternative to the traditional methods that require stoichiometric amounts of toxic and wasteful oxidants and metal catalysts. In electrochemical transformations, electrons are used as safe and clean reactants to generate highly reactive radical intermediates under the mild reaction conditions providing access to the previously unapproachable reaction pathways. Combining electrochemistry with the continuous-flow technology, we managed to obtain highly valuable building block, such as aziridines and electron-rich phenols, starting from common and broadly available starting materials.

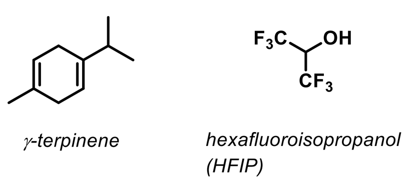


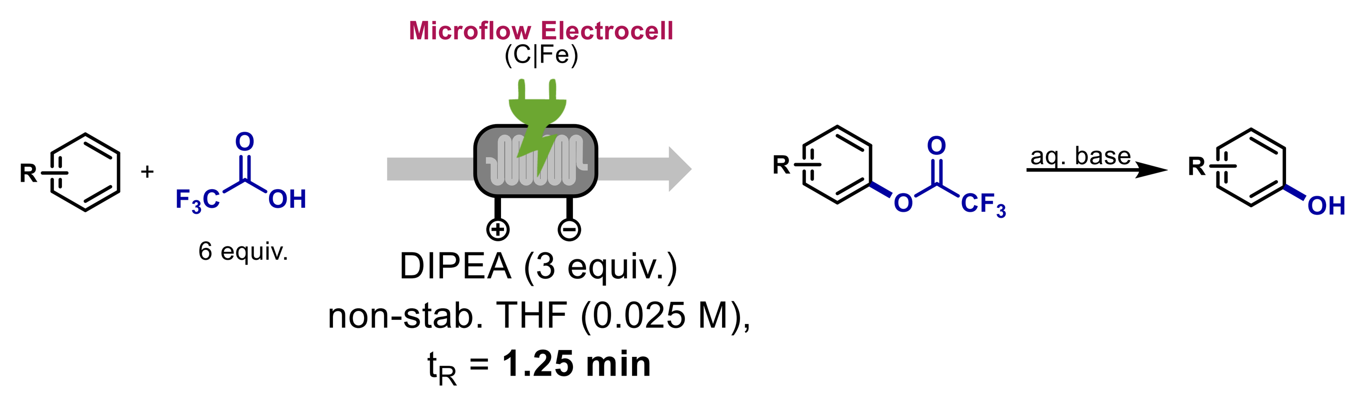


- **easy to assemble and use**
- **fully modular**
- **effective mass- and heat-transfer**
- **high surface-to-volume ratio**
- **improved reaction selectivity**
- **high reproducibility**
- **reliable scale-up**
- **multistep reaction sequences**



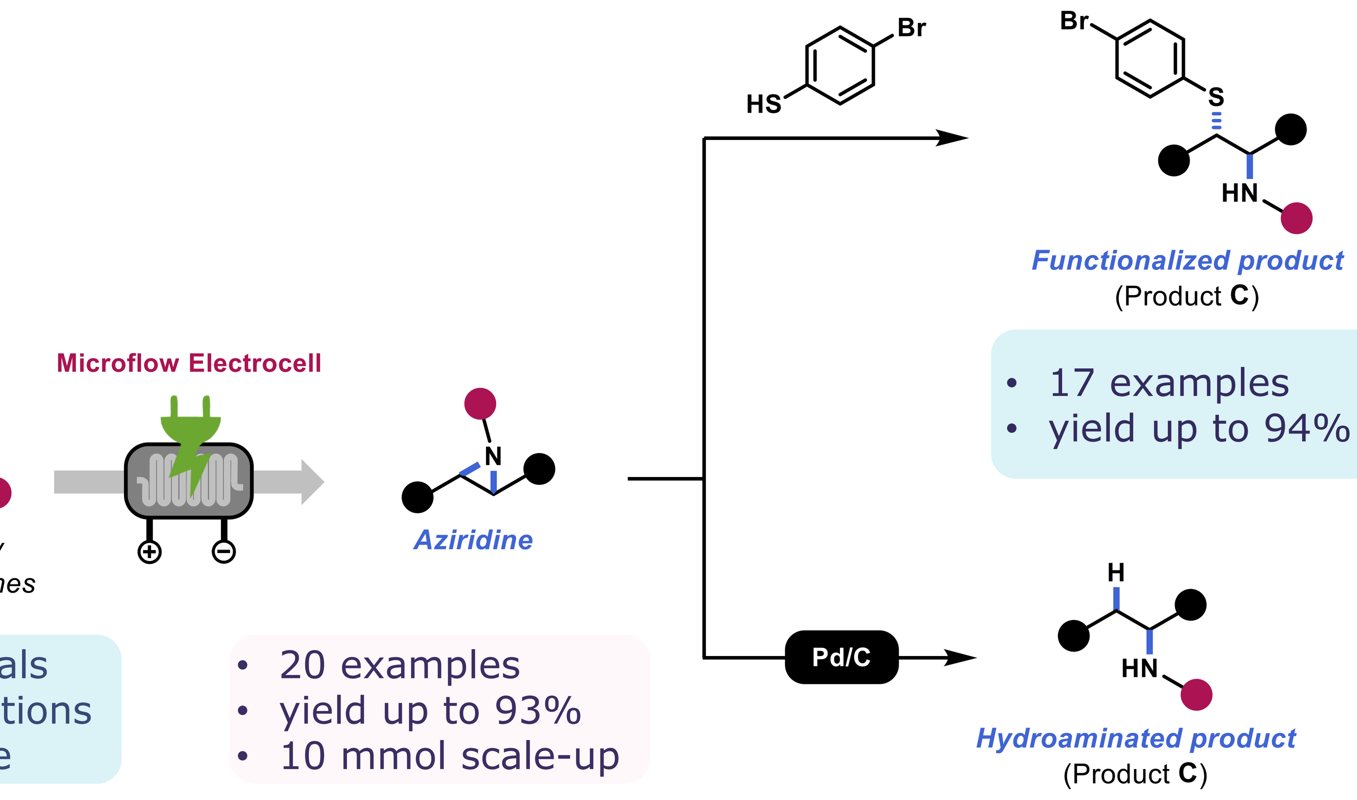
Entry	Variation from the standard conditions	Yield (%)
1	none	88 (72)
2	neat HFIP	traces
3	2.5 equiv. amine	75
4	no γ-terpinene	78
5	graphite cathode	59
6	p-TsOH (1 equiv.)	32
7	no electricity	0
8	batch (16 h)	14





- from electron-rich arenes
- 1.25 min reaction time
- 15 examples
- 10 mmol scale-up
- yield up to 68%

Entry	Variation from the standard conditions	Conversion (%)	Yield (%)
1	TFA (3 equiv.), Bu_3N (2 equiv.), CH_3CN (0.1 M), t_R = 5 min	71	31
2	TFA (3 equiv.), Bu_3N (2 equiv.), stab. THF	90	74
3	none	88	71
4	no electricity	0	0
5	batch, 3.9 F	5	5
6	batch, 11.8 F	33	29

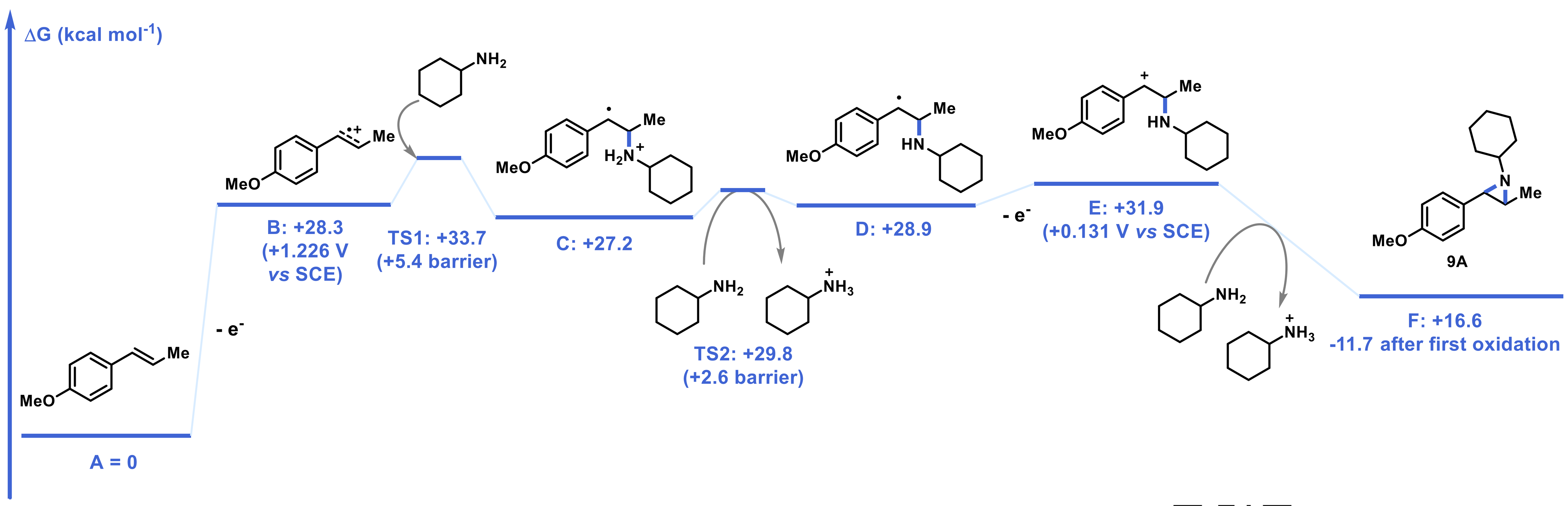


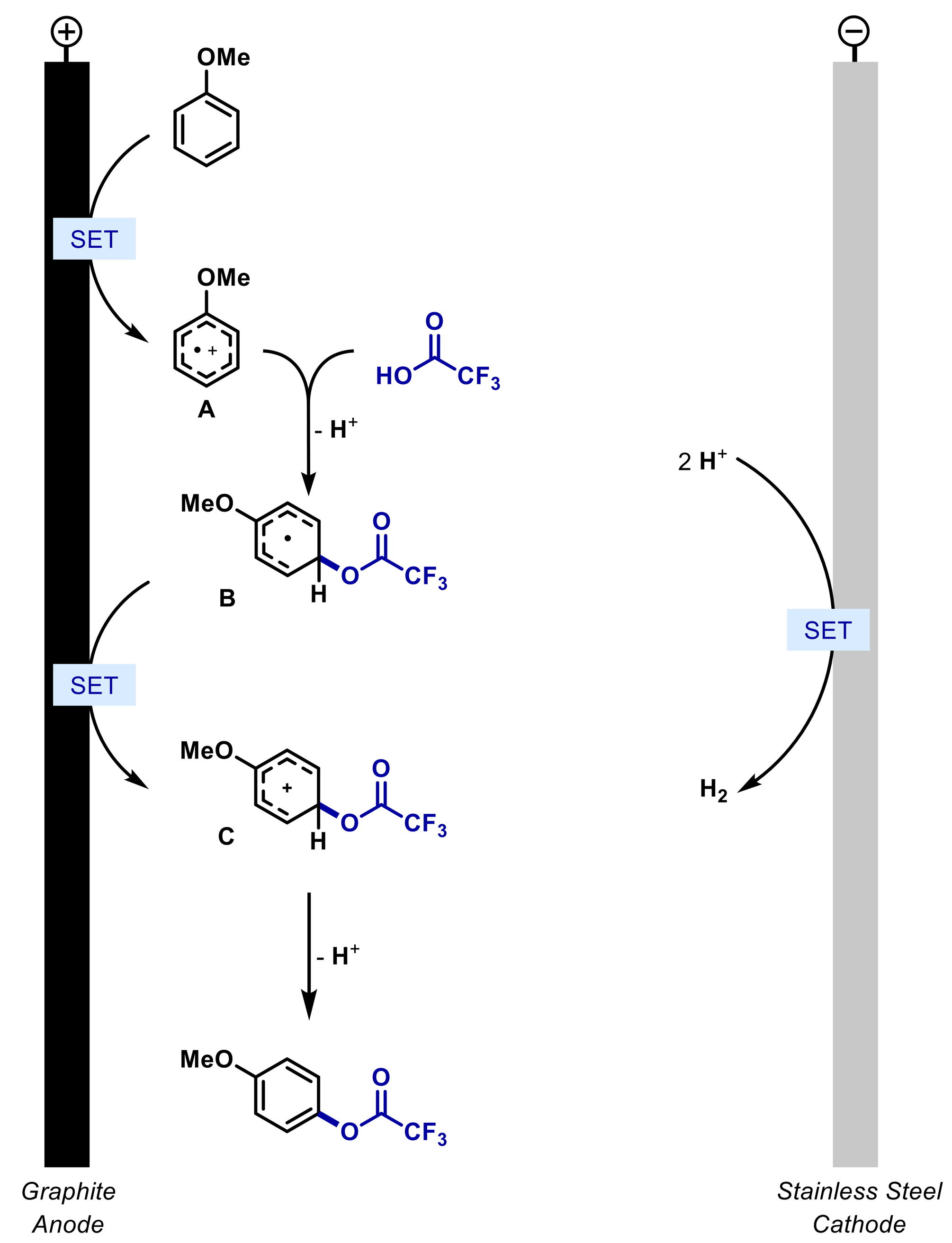
- 17 examples
- yield up to 94%

- commodity chemicals
- mild reaction conditions
- 5 min reaction time

- 20 examples
- yield up to 93%
- 10 mmol scale-up

- hydrogen from electrolysis
- safe and efficient
- anti-Markovnikov
- 6 examples
- yield up to 60%





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