

Electrochemical Synthesis of Aziridines in Continuous-Flow

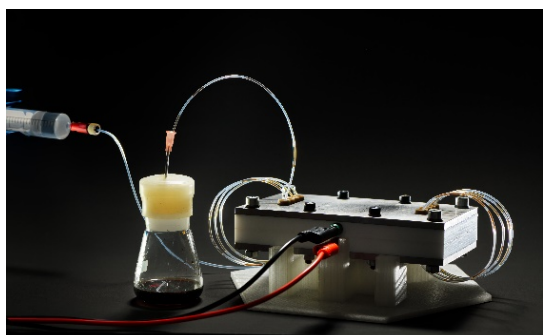
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Introduction

Organic molecules containing aziridine core structure are very useful synthetic intermediates for the formation of complex carbon-nitrogen bonds, which are mainstream in different materials, agrochemicals and in biologically active compounds, thus making the efficient and selective construction of the C-N bond particularly important in modern synthetic chemistry. Electrochemical transformations attract more and more attention as an alternative to classical thermochemical processes. In such transformations, electrons are used as “traceless and green reagents” to generate highly reactive radical particles under the mild reaction condition providing access to the previously unapproachable reaction pathways.

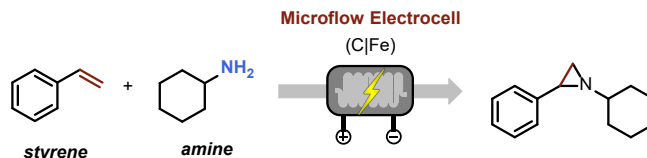
Project summary



In our group, an electrochemical microreactor is used to conduct aziridation reaction in continuous-flow mode. Performing reaction in flow enables to overcome mass-transfer limitation and provides equal charge distribution over the whole reaction mixture increasing productivity and selectivity of the transformation.

Primary amines undergo anodic oxidation and highly reactive amino-centered radical cation is trapped by styrene moiety. Further single electron oxidation of benzyl radical leads to the formation of carbocation and cyclization.

In our project, we study the influence of different styrene substituents on the reaction efficiency as well as possibility to enlarge the reaction scope by using primary and secondary amines as a nitrogen-atom containing coupling partners.



Project goals

The main aim of the project is to develop efficient and reliable method electrochemical synthesis of aziridines, which are highly valuable intermediates for the organic synthesis, and to demonstrate the supremacy of the continuous process over the conventional batch synthesis.

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