Utilization of electrochemically induced cleavage of various sulfonimides

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Currently, efforts are being made to carry out syntheses using green chemistry procedures designed (or redesigned) to reduce the environmental impacts of the processes. In this sense, the electrosynthetic approach could provide clues. Since electrochemistry brings benefits such as high selectivity in connection with facile operation, eco-friendly conditions, or economical aspects relating to lower demands for chemical agents and space, the application of this methodology is desirable. Unfortunately, the processes employing electrochemistry are still relatively rare. This could be explained by the lack of knowledge of the electrochemical redox mechanisms, which significantly differs across individual molecules due to the interplay of all functional groups present in their structures. However, the key to understanding the redox behaviour of polyfunctional molecules lies in the detailed analysis of electrochemical results at the molecular level[1]. A good example of the use of electrosynthesis was recently published by Huang et al[2], describing simple electro-reductive hydrodefunction-

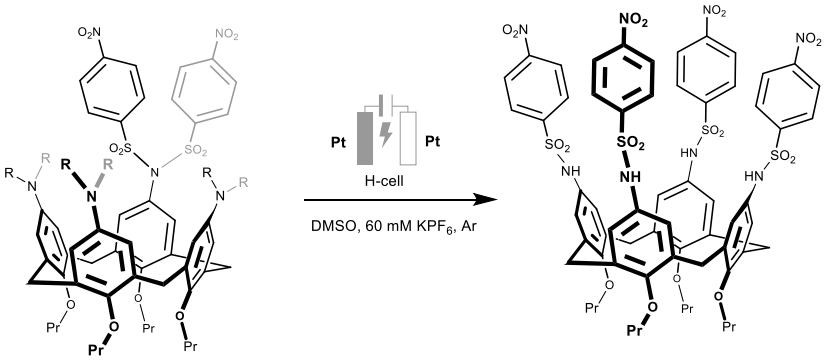

Figure 1: Electrochemical cleavage of octakis-nosylated calixarene.

alization employing triethylamine as a reductant to cleave C-halogen, N-C, O-S, O-C, C-C, and C-N bonds.

In this work, we describe the unexpected electrochemical cleavage of sulfonimides, providing a direct pathway to corresponding sulfonamides. For this purpose, 16 substances were synthesized and tested, reflecting the influence of different electron effects of -SO_2Ph-R substituents, and the impact of the number of nosyl units present in molecules. In the case of octakis-nosylated calixarenes, the electrochemical cleavage *via* direct potential-controlled electrolysis was compared with conventional organic synthetic procedures. After electrolysis, all prepared sulfonamides were isolated in excellent yields.

References

1. Hammerich O.; Organic Electrochemistry Revised and Expanded; 5^{th} ed., CRC Press, Boca Raton **2016**.
2. Huang, B.; Guo, L.; Xia, W. *Green Chem.*, **2021**, *23*, 2095–2103.