Electrochemical $S_{RN}1$ Reaction with Thianthrenium Salts

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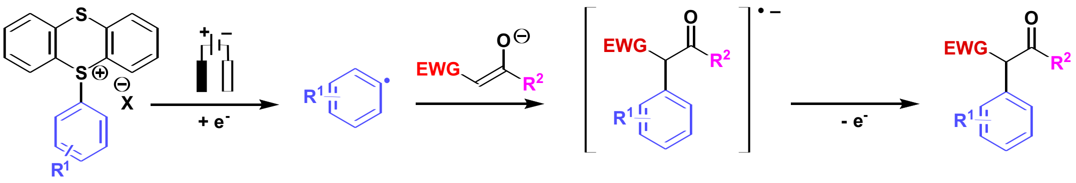
Since its discovery in 1960, the $S_{RN}1$ reaction has evolved as a powerful reaction for the functionalization of poorly reactive aryl halides and the formation of a large panel of carbon-carbon and carbon-heteroatom bonds. Among the various approaches developed to promote this transformation, electrochemical approaches have provided insight into the reaction mechanism.[1] With the renewal of electrosynthesis, exploration of electrochemical $S_{RN}1$ reactions could provide an opportunity to reassess and expand these reactions as sustainable synthetic methodologies.[2]

Besides, aryl thianthrenium salts have emerged as versatile synthetic handles for the selective functionalization of aromatic derivatives, and have found numerous original applications. Since their introduction by Ritter in 2019,[3] a broad range of transformations has been reported, enabling the formation of a wide array of C–C bond or C–heteroatom bonds. Most of these transformations exploit the ability of sulfonium salts to react with transition metal catalyst as pseudohalide, or on their propensity to generate aryl radicals under the auspice of photoredox catalysis or reductive conditions.[4] Because thianthrenium salts possess a lower reduction potential (- 1.5 V vs $KCl_{(sat)}$) than aryl halides, they are good candidates for the realization of this reaction.

Here we present the electrochemical $S_{RN}1$ reaction with aryl thianthrenium salts and β-dicarbonyl compounds under green and mild conditions. The reaction was applied to various partners, affording the products in moderate to good yields.



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