

Electrochemical Dimerization of 3-Substituted-2-Oxindoles: Many Routes, One Destination

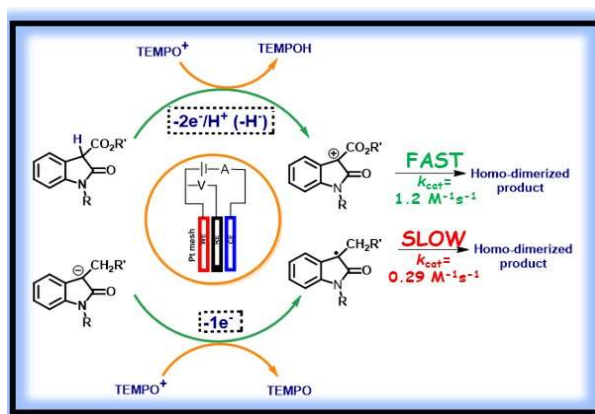
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Abstract

Dimerized 3-substituted 2-oxindoles are building blocks for alkaloids, and hence, the synthesis of these molecules is of great interest. Previously, synthesis of these molecules was reported employing chemical methodologies with toxic catalysts. Electrochemical synthesis of these molecules can make the process significantly greener and more sustainable. In this regard, first, I will discuss the dimerization of 3-carboxylate-2-oxindole and 3-alkyl-2-oxindole by direct oxidation of these substrates on the electrode surface.^{1,2} A detailed mechanistic investigation involving proton-coupled electron transfer (PCET) will be discussed.^{1,2} For the dimerization of 3-carboxylate-2-oxindole, three different routes will be discussed.¹ Thereafter, I will present electrocatalytic routes involving TEMPO as a redox mediator and TEMPO⁺ as an active catalyst for the dimerization of three different types of 2-oxindoles.³ 3-carboxylate-2-oxindole followed a 2e⁻ transfer/hydride transfer mechanism for the dimerization, while 3-alkyl-2-oxindole and 3-alkylcarboxylate-2-oxindole followed a 1e⁻ transfer pathway involving radical species for dimerization.³ Moreover, many aspects of green chemistry, such as minimizing waste generation, recovery of electrolytes etc., will also be discussed.³



References

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3. Sulekha Sharma, Saina Shaheeda, Kundan Shaw, Alakesh Bisai, Amit Paul. *ACS Catal.* **2023**, 13, 2118-2134.