
ELECTROCHEMICAL CARBOXYLATION OF ARYL AND HETEROARYL HALIDES

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Résumé

Carboxylated substrates are extremely useful in the pharmaceutical field as they are perfect building blocks for more complex molecules. Carbon dioxide (CO₂) is considered an ideal C1 reagent for organic synthesis due to its absence of toxicity, low cost, and availability as a renewable resource. However, it is not easy to activate under mild conditions due to its thermodynamic stability and kinetic inertness.(1) Therefore, efficient chemical methods for the carboxylation of aryl halides using transition metal catalysts are very attractive.(1) In this context, palladium(2) and nickel(3) represent the most widely used transition metals in carboxylation. However, they often require the additional presence over a stoichiometric amount of metallic reductants such as zinc or manganese, which represents a significant constraint for an industrial scale development. Moreover, the price of transition metals catalysts rises continuously.

Based on the know-how of the laboratory in organic electrosynthesis,(4) the main objective of the project is to develop a general method for the electrochemical carboxylation of arenes and heteroarenes using CO₂, which will avoid adding the catalyst. The first part of the work has consisted in the examination of experimental parameters. The optimized conditions were then applied to various aryl and heteroaryl halides substrates.

References

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