

ELECTROCATALYTIC IODOPERFLUOROALKYLATION OF UNSATURATED HYDROCARBONS

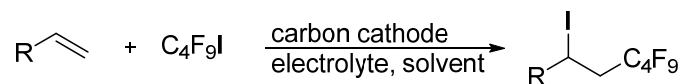
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Methods for the introduction of fluorinated moieties into organic molecules are of significant synthetic interest. Fluorine in bioactive compounds can alter key physicochemical properties [1]. The insertion of fluoroalkyl substituents can be achieved in an electrophilic, nucleophilic and radical fashion [2]. The generation of perfluoroalkyl radicals by either UV-light or using radical initiators is widely found, whereas only few examples for electrochemical methods have been reported. Such methodology represents a greener, commercially valuable alternative to classical synthesis [3,4].

The electrochemical addition of iodoperfluoroalkanes to alkenes and alkynes was first investigated by Amatore *et al.* [5,6]. The research focus was mainly on a mechanistic understanding rather than on a preparative application. However, a general synthetic protocol for the perfluoroalkylation of alkenes would be extremely favorable.

We started a systematic study of the iodoperfluoroalkylation of alkenes by optimisation of the reaction conditions. The addition of nonafluoroiodobutane to vinylcyclohexane was performed as a standard reaction. The influence of solvent, electrode material, electrolyte, substrate concentration, current density and charge was explored.



After successful optimisation the scope of iodoperfluoroalkanes and functional group tolerance of substrates was investigated. The developed protocol is extremely advantageous as electrons are the sole reagent and no further catalyst or initiator is needed to achieve successful iodoperfluoroalkylation.

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