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ELECTROCHEMICALLY INITIATED ADDITION OF F-ALKYL IODIDES TO ALKENOLS AND ALKYNOLS. SOME ELEMENTS OF THE CHEMISTRY OF THE COMPOUNDS OBTAINED

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The addition of F-alkyl iodides $CF_3(CF_2)_nI$ (n=1,3,5,7), R_FI, to alkenols and alkynols has been performed through electrochemical initiation. The general scheme is as follows (for alkenols):

$$R_FI + e^- \longrightarrow (R_FI)^{\cdot -} \longrightarrow R_F^{\cdot} + I^-$$

$$R_F^{\cdot} + CH_2{=}CH\text{-}CR_1R_2OH \longrightarrow R_F\text{-}CH_2\text{-}\dot{C}H\text{-}CR_1R_2OH$$

$$R_F\text{-}CH_2\text{-}\dot{C}H\text{-}CR_1R_2OH + R_FI \rightarrow R_F^{\cdot} + R_FCH_2\text{-}CHI\text{-}CR_1R_2OH$$

The process has been studied in dimethylformamide (DMF) as a solvent, at mercury and at carbon cathodes, and extended to the reduction of a phase of F-alkyl iodide - alkenol or alkynol dispersed in an aqueous phase (H_2O/KCl) (Fr. Pat. 8015121 ; Fr. Pat. 81.24364).
The efficiency of the process is discussed and compared to other possible routes for such a reaction.
In addition are presented some elements of the chemistry of the compounds obtained during the described electroinitiated addition, and particularly the efficient synthesis of :

epoxides $R_F\text{-}CH_2\text{-}\underset{\backslash\,O\,/}{CR_3\text{-}CR_1R_2}$, enones $R_F\text{-}CH{=}CH\text{-}\underset{\underset{O}{\|}}{C}\text{-}CH_3$,

alkynes $R_F\text{-}C{\equiv}C\text{-}CR_1R_2OH$, $R_F\text{-}C{\equiv}C\text{-}H$, keto alcohols, allene phosphonates, 5F-alkyl-3(2H) furanones, etc.

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