SELECTIVE ACTIVATION OF ORGANIC MOLECULES BY ELEMENTAL FLUORINE

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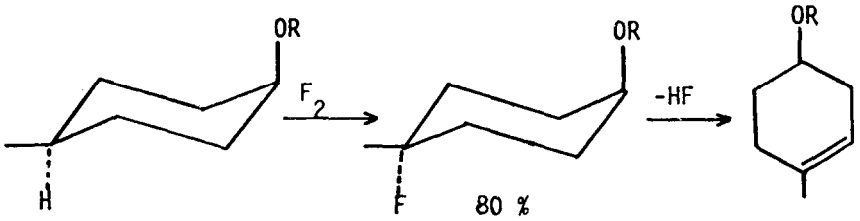
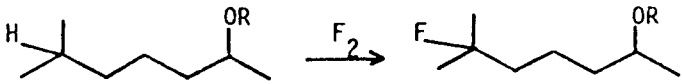
Reactions on tertiary hydrogen atoms, attached to unactivated saturated carbons, are very rare and usually inefficient. The electron density however, of a carbon-tertiary hydrogen bond is relatively high and therefore there is a chance it will react with a strong electrophile. One of the strongest electrophiles existing is, of course, the electrophilic fluorine. Two main sources for such an unusual species exist. One source is the various fluoroxy compounds like CF_3OF or CF_3COOF ant the other is the elemental fluorine itself.

Indeed, when fluorine is allowed to react, at low temperatures, with various alkylcyclohexanol esters, a highly regio- and an absolutely stereospecific electrophilic substitution on the tertiary unactivated hydrogen takes place as for example:



The radical pathway possibility of these reactions is excluded and it is believed that they are of ionic nature. By dehydrofluorination, a double bond is introduced in sites that no other reagent is known to do, thus activating the molecule towards further chemical transformations. The influence of the electron-withdrawing group on the reaction center will also be discussed.

The described reaction is not restricted only to cyclic compounds as aliphatic chains also react as expected, i.e.



The scope of these unusual reactions in both alicyclic and aliphatic fields will be evaluated.