THE INTRODUCTION OF ELEMENTAL FLUORINE INTO ORGANIC SYNTHESIS METHODOLOGY USING ACETYL HYPOFLUORITE AS A CARRIER

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Acetyl Hypofluorite CH_3COOF (1)which is synthesized in situ using elemental fluorine,is the first hypofluorite without perfluoro-alkyl group. Obviously its oxygen bound fluorine is less reactive in electrophylic fluorinations than the fluorine in CF_3COOF, CF_3OF and alike. This makes 1 a better candidate for cleaner reactions with many organic substrates. Acetyl hypofluorite adds itself across various double bonds in Markovnikoff mode proving the electrophilicity of the oxygen bound fluorine. Unlike most of the other electrophilic fluorinating reagents it reacts well with various anionic centers present in organo-metallic compounds. This reaction opens a new route for synthesis of numerous fluorine containing derivatives.

Of special importance is the electrophilic fluorination of activated aromatic rings. Phenol and aniline derivatives usually react smoothly with 1 to give mainly the ortho fluoro derivative. We found that the reaction proceeds via addition elimination mechanism and indeed, when working in very mild conditions some of the corresponding adducts can be isolated. This reaction opens a new and effective route for rapid specific aromatic fluorinations a route which can substitute the old Balz-Schiemann reaction in many cases.

Since acetyl hypofluorite can be prepared in a short time from F_2 and then react in situ very rapidly with the organic substrate it is an excellent candidate to serve as a carrier for ^{18}F radioisotop from the radio active elemental fluorine to biological interesting compounds for use in the positron emitting transaxial tomography (PETT).