

ORGANOMETALLICS FROM SOME FLUOROHALOCOMPOUNDS

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Readily available fluorohaloethanes of the general formula CF_3CXYZ ($\text{X}, \text{Y} = \text{F}, \text{Cl}, \text{Br}$; $\text{Z} = \text{Cl}, \text{Br}$) were found to be versatile synthetic intermediates for introducing a fluoro- or fluorohaloethyl group into organic molecules via organo-metallic compounds of magnesium and zinc. The low temperature metal-halogen exchange reaction of the ethanes with alkyl- or aryl-magnesium halides affords Grignard reagents $\text{CF}_3\text{CXYMgHal}$ which react with aldehydes and ketones to give alcohols. The Grignard compounds failed to react with acid derivatives and their carboxylation by carbon dioxide gave only poor yields of the acids.

The carboxylic acids $\text{CF}_3\text{CXYCO}_2\text{H}$ were easily prepared by the reaction of the ethanes CF_3CXYZ with zinc and carbon dioxide under atmospheric pressure. The yields of carboxylation were substantially enhanced by the application of ultrasound. The chlorine- and bromine-containing acids were smoothly reduced to fluoropropionic acids $\text{CF}_3\text{CFHCO}_2\text{H}$ and $\text{CF}_3\text{CH}_2\text{CO}_2\text{H}$.