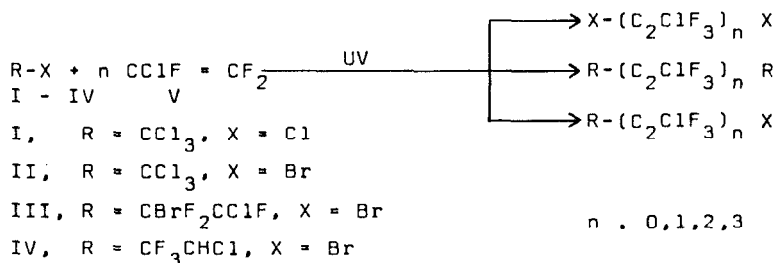# ADDITION OF SOME HALOALKANES TO CHLOROTRIFLUOROETHYLENE

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It was found that the addition of some haloalkanes i.e.
tetrachloromethane(I), bromotrichloromethane(II), 1,2-dibromo-
1-chlorotrifluoroethane(III) and 1-bromo-1-chloro-2,2,2-tri-
fluoroethane(IV) to chlorotrifluoroethylene(V) in conditions
of a relatively strong initiation by UV irradiation and a low
concentration of olefin V gives three types of adducts resp.
telomers. The reactions can be summarized as follows:

$$R\text{-}X + n\ CClF = CF_2 \xrightarrow{\ UV\ } \begin{cases} X\text{-}(C_2ClF_3)_n\ X \\ R\text{-}(C_2ClF_3)_n\ R \\ R\text{-}(C_2ClF_3)_n\ X \end{cases}$$

I - IV   V

I,   R = CCl_3, X = Cl

II,   R = CCl_3, X = Br

III, R = $CBrF_2CClF$, X = Br   n . 0,1,2,3

IV,   R = CF_3CHCl, X = Br

It is shown by means of chemical transformations, ^{19}F-NMR
with shift reagent $Yb(fod)_3$ and mass spectrometry that the ma-
jor product among 1:1 adducts in the case of addition I and II
is $R\text{-}CClFCF_2\text{-}X$. The products of the type $R\text{-}(C_2ClF_3)_2\text{-}X$ in the
same case are mixtures of compounds in which the product of
structure $R\text{-}CClFCF_2\text{-}CClFCF_2\text{-}X$ predominates.

The course of addition is discussed. It is assumed that
the reactions are initiated by halogen atoms and the recomina-
tions of free radicals occur to a greater extent than the chain
transfer.

The addition of 1,2-dibromo-1-chlorotrifluoroethylene has
opened a new route for synthesis of perfluoro-1,3-butadiene,
perfluoro-1,3,5-hexatriene and difluoroacetic acid.