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REACTION OF ELEMENTAL FLUORINE WITH BROMOFLUOROALKANES

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There have been few reports of reactions of elemental fluorine with bromo derivatives and we now find that bromine in bromofluoroalkanes may be replaced by fluorine and, in some cases, in very high yields. For example, fluorination of $Br(C_2ClF_3)_nBr$, n = 1-5, with elemental fluorine diluted with 50% nitrogen gives the corresponding $Br(C_2ClF_3)_nF$ and $F(C_2ClF_3)_nF$ at room or 0°C temperature in high yields. The terminal CBrClF groups are more reactive than $CBrF_2$ ones, e.g.:

$$CBrClFCBrF_2 \longrightarrow CBrF_2CClF_2\ (80\%) + CClF_2CF_3\ (20\%)$$

Under similar conditions $CF_3CBrFCBrF_2$ yields $CF_3CBrFCF_3$ as the main product.

The mechanism for the reaction is presumed to be free radical with a moderating effect of bromine (respective bromine fluorides) that was displaced.

The utility of the reaction in interpretation of complex ^{19}F NMR spectra of isomeric mixtures introduced above will be described.