THE SYNTHESIS OF FUNCTIONALISED PERFLUOROCYCLOHEXANES BY THE LIQUID PHASE FLUORINATION OF FLUOROAROMATICS WITH ELEMENTAL FLUORINE

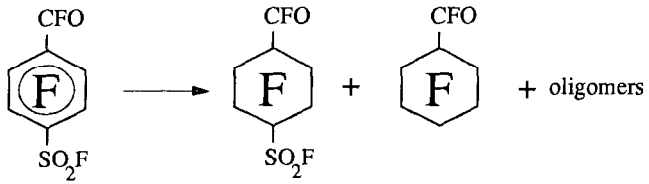
H C Fielding and I M Shirley

ICI Industrial Chemicals, PO Box 8, The Heath, Runcorn WA7 4QD (UK)

The fluorosulphonyl perfluorocyclohexane carbonyl fluorides 1,4 FOC.C_6F_{10}.SO_2F(I) and 1,2 FOC.C_6F_{10}.SO_2F(II) have been synthesised [1] by direct fluorination of respectively 1,4 FOC.C_6F_4.SO_2F(III) and 1,2 FOC.C_6F_4.SO_2F(IV).

The use of elemental fluorine for the fluorination of aromatic compounds is usually unsuccessful, even under very carefully controlled conditions, producing mainly oligomers and polymeric tars [2].

However, fluorination of 1,4 FOC.C_6F_4.SO_2F(III) [1,3] in $CCl_2F.CClF_2$ with F_2/N_2 at ambient temperatures gave 1,4 FCO.C_6F_{10}.SO_2F(I), together with C_6F_{11}.COF(V) and oligomers.



(III) (I) (V)

This novel difunctional perfluorocyclohexane has been characterised by reaction with alcohols and amines, where the different reactivities of the acid fluoride groups allows derivatives to be prepared on the carbonyl fluoride, leaving the sulphonyl fluoride intact.

1 H C Fielding, P H Gamlen and I M Shirley, EP 0 331 321.

2 F Cacace, P Giacomello and A P Wolf, J Am Chem Soc 102 (1980) 3511.

3 H C Fielding, I M Shirley, J Fluorine Chem 45 (1989) 105.