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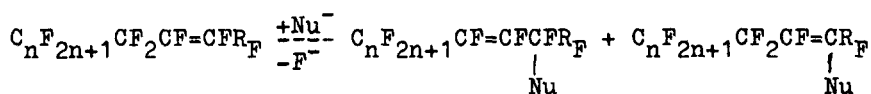
SYNTHESIS OF FLUOROSURFACTANTS FROM MIXTURES OF PERFLUORO-ALKENES

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The irradiation of polytetrafluoroethylene with accelerated electrons yields a mixture of homologous perfluoroalkanes and perfluoroalkenes with isomeric C-C double bond. Such mixtures of straight-chained perfluoroalkenes with a chain length of $C_6 \dots C_{13}$ can easily be produced and used as starting material for the preparation of F-containing surfactants.

The oxidation of these perfluoroalkenes yields alkanic acids. Reactions of the perfluoroalkenes with different nucleophiles, sometimes followed by subsequent reactions (as sulfonation or sulfatation), open a wide variety to synthesize fluorosurfactants of all types (anionics, nonionics, cationics, amphoteric). The nucleophilic reaction¹ occurs as an addition-elimination-process according to the following equation:


 $R_F = F, C_m F_{2m+1}$
 $Nu = RO, RS, R_1 R_2 N, HO, HSO_3, (ROOC)_2 CH, (RO)_2 P(O)$

Synthesis and properties of some examples of these surfactants from perfluoroalkenes will be presented. Structure-property (especially surface tension)-relations will be discussed. The comparison with commercial products demonstrates the high quality of these new surfactants. They are suitable for industrial applications at many fields.

¹ P.Dietrich, G.Engler, U.Groß, K.Lunkwitz, D.Prescher and J.Schulze, DD-PS 131 555 (1978); US-PS 4 225 404 (1980)