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GAS CHROMATOGRAPHIC STUDIES OF PERFLUOROALKANES AND PERFLUOROALKENES

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Mixtures of lower perfluoroalkanes and perfluoroalkenes are formed during the degradation of PTFE under inert conditions with help of accelerated electrons by cleavage of C-C and C-F bonds. The share of compounds in the range of C_6 to C_{14} is used to prepare fluorosurfactants.

The gas chromatographic analysis of these mixtures shows their complicated composition. At the following pattern substances the gas chromatographic properties were studied to find out suitable stationary phases: perfluoro-n-alkanes ($C_7; C_8; C_{10}$), perfluoro-n-hept-1-ene, 1H-perfluoro-n-heptane, perfluoro-methylcyclohexane, perfluoro-4-ethyl-3,4-dimethylhex-2-ene, perfluorobenzene and perfluorotoluene. A good selectivity and retention is available with fluorine containing stationary phases. Their efficiency depends on their content of fluorine and on the kind and number of functional groups. Liquid phases without any fluorine content show a small separation efficiency, even at a high degree of polarity, because of their very low partition coefficients.

Results are submitted with the use of adsorbents (Carbo-pack C, Chromosorb 101) for the separation of perfluoroalkane-perfluoroalkene-mixtures.

The reaction of perfluoroalkenes with nucleophilic agents can be applied in reaction gas chromatography. If polyethyleneimine is used as a liquid phase, straight chain as well as branched chain perfluoroalkenes can be detected in mixtures, because stable compounds are formed which were not eluted.