Journal "Fluorine Notes", Volume # 2(45), March - April 2006

THE MANUFACTURE OF EXTREMELY PURE POLYFLUOROCHEMICALS FOR MEDICAL APPLICATIONS

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Polyfluorinated chemicals have gained widespread acceptance in various fields of medicine due to their unique physicochemical properties: chemical stability, high solubility of gases in them (that of O_2 is up to 50% by vol.), high specific weight (~1.9), low surface tension, high transparency, sometimes high radiodensity, etc.

High solubility of gases (O_2, CO_2 , etc.) in perfluorocarbons predetermined those substances usage for efficient gas-carriers and gas-transport media.

Having in mind the specificity of those medical applications of polyfluorinated chemicals their purification to biologically inert state gains primary importance; so inert state requires both high content of the main substance (>99.9%) and very low content of impurities - no more than 10-5 mole/l as recalculated to the chemically bonded fluoride-ion.

The quantity of chemically bonded fluoride-ion characterizes that of reactive fluorinated impurities mixed with the main substance and measured with the help of a fluorine-selective electrode.

The authors investigated the possibility to produce extremely pure polyfluorinated chemicals using adsorption cleaning methods. Following rectification and preliminary cleaning from acid impurities the polyfluorinated substance is directed through columns filled with activated carbon and kieselguhr at 20-100 ^oC, in so doing the fluoride-ion content reaches the value 1-2*10-5 mole/l.

The method was applied to achieve the said purity of perfluorodecalin, perfluoropolyesters RFO(CF(CF3)-CF2O)nRF, perfluorooctylbromide, perfluorinated tertiary amines. The cleaning procedure resulted also in the increase of those substances electrical resistance to as high as $1*10^{15}$ ohm*cm.

The polyfluorinated substances purified in this manner are applicable in ophthalmology, bronchoscopy and for gas-carriers in medical practice.