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## Sorption of radionuclides in the environment of uranium hexafluoride

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Impurity  $^{106}\text{RuF}_5$ ,  $^{237}\text{NpF}_6$  and  $^{99}\text{TcF}_6$  in regenerated of uranium hexafluoride are the most radiation-hazardous impurity. For decrease in a dose of radiation it is expedient to carry out extraction of these elements from  $\text{UF}_6$  [1, 2].

Researches on catching of radionuclides from dividing streams raw and perfect of uranium hexafluoride are carried out on various fluoride adsorbents of I, II, III and VIII groups of the Mendeleev's table at  $25^\circ\text{C}$  and  $115^\circ\text{C}$ . The maximum quantity  $^{237}\text{NpF}_6$  is absorbed on  $\text{MgF}_2$  and  $\text{AlF}_3$ ,  $^{106}\text{RuF}_5$  —  $\text{AlF}_3$ ,  $^{99}\text{TcF}_6$  —  $\text{CaF}_2$ . At an increased temperature extent of extraction of some required impurity on sorbents, for example,  $^{99}\text{TcF}_6$  on  $\text{CaF}_2$ ,  $^{237}\text{NpF}_6$  on  $\text{AlF}_3$  rather sharply decreases [3].

The analysis of results shows that selective concentration of impurity from a gas stream of uranium hexafluoride needs to be carried out via the cascade of consistently located fluoride adsorbents in strictly certain order:  $\text{FeF}_3 \rightarrow \text{LiF} \rightarrow \text{CaF}_2 \rightarrow \text{AlF}_3$  at a temperature of  $25$ – $40^\circ\text{C}$ . At such arrangement of sorbents on head  $\text{FeF}_3$  ruthenium will be occluded selectively ( $K(\text{Ru}/\Sigma) = 36 - 45$ ), in a front layer of  $\text{CaF}_2$  catch  $\text{TcF}_6$  with small impurity of neptunium and ruthenium ( $K(\text{Tc}/\Sigma) = 4,4 - 8,2$ ). For essential catching of neptunium and ruthenium before  $\text{CaF}_2$  lithium fluoride need to place. Residual amounts of radionuclides are absorbed on  $\text{AlF}_3$ . The radiation background of pure  $\text{UF}_6$  will be defined generally  $^{237}\text{Np}$ .

As a result of the analysis of the present data, some regularities on behavior of  $\text{RuF}_5$  is received. Taking into account all three types of periodic dependence of behavior of ruthenium pentafluoride in system of the considered fluorides, it is possible to assume that the most active adsorbent  $^{106}\text{RuF}_5$  in the environment of uranium hexafluoride will be  $\text{BeF}_2$ .

### Literature

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2. Patent RU No. 2068287 (1993).
3. E.F.Lednev, O.B.Gromov Sorption allocation of microamounts of radionuclides from uranium hexafluoride // In "First Russian conference on radiochemistry. Dubna, May 17-19, 1994. Thesis of reports". - M.: Publishing house of the Russian Academy of Sciences, 1994, p. 179.

**Primary author:** Dr GROMOV, Oleg (Borisovich)

**Co-author:** Dr TORGUNAKOV, Yury (Borisovich)

**Presenter:** Dr GROMOV, Oleg (Borisovich)

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