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THE REACTION OF URANIUM HEXAFLUORIDE WITH SILVER FLUORIDE IN ANHYDROUS HYDROGEN FLUORIDE AND THE CHEMICAL PROPERTIES OF THE PRODUCT Ag_2UF_8

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UF_6 reacts with AgF dissolved in anhydrous hydrogen fluoride to precipitate Ag_2UF_8. Ag_2UF_8 has some unexpected properties: On reaction with water it produces O_2 and reduced uranium. No adequate explanation could be found of why UF_6 and AgF combined in this manner should produce a powerful oxidant. Raman spectra and chemical properties of the solid products are given.

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FLUORINATION OF URANIUM RESIDUES IN ISOTOPE ENRICHMENT PLANTS

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One possible method to remove solid deposits of uranium hexafluoride decomposition products (UF_5, $UO_2F_2 \cdot H_2O$) which may be formed during long-time operation of uranium enrichment plants, is the application of a gaseous mixture of $CBrF_3$ and F_2 at a total pressure well below atmospheric pressure.
The feasibility of this procedure has been demonstrated in technical components of the "Separation Nozzle"-process for the enrichment of U-235 which is under development at the Nuclear Research Center of Karlsruhe, W.-Germany.[1]
The mixture of $CBrF_3$ and F_2 is not stable thermodynamically but shows slow decomposition which is catalyzed by metallic surfaces. The reaction $CBrF_3 + 3F_2 \rightarrow CF_4 + BrF_5$ produces BrF_5, but the intermediate formation of BrF_3 seems reasonable. Since BrF_3 is a well known agent for the fluorination of uranium fluorides and oxifluorides into UF_6, but is hardly applicable because of its low vapour pressure, the system $CBrF_3/F_2$ offers the possibility to decontaminate isotope enrichment facilities from uranium residues.

[1] E.W. Becker, W. Bier, P. Bley, W. Ehrfeld, K. Schubert, D. Seidel (paper presented to the AIChE 1982 winter meeting, Orlando, Fla., Feb. 28 - March 3, 1982, also published as report KFK 3310 (1982)