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PRELIMINARY NOTE

On the photosynthesis of uranium hexafluoride

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Uranium hexafluoride is usually prepared by fluorination of uranium tetrafluoride or uranium oxides in a stream of elemental fluorine at elevated temperatures.

Recently we have found that uranium hexafluoride can also be synthesized photochemically by irradiation of a suspension of uranium tetrafluoride in liquefied fluorine with visible or near UV light at -196°C. The synthesis is similar to that of krypton difluoride [1] or dioxygen difluoride [2] , with the only difference that uranium tetrafluoride, contrary to krypton or oxygen, is not soluble in liquefied fluorine and possesses negligible vapour pressure at -196°C. The apparatus used was also the same as for the synthesis of KrF_2 or O_2F_2.

The average rate of formation of uranium hexafluoride under the conditions used is about 100 mg UF_6 per hour. However, the rate of the reaction increases significantly after the irradiation has been interrupted and uranium hexafluoride formed pumped off, since this frees the surface of uranium tetrafluoride from the reaction product. The results obtained are given in Table 1.

TABLE 1: Yield of uranium hexafluoride

	time of irradiation (hours)	UF_4 used (millimoles)	UF_6 formed (millimoles)
1.	10	6.37	2.64
2.	10	6.37	4.67

In the first experiment the irradiation was carried out without interruption, in the second one it was interrupted every hour and the UF_6 formed removed by pumping off.

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2 A. Šmalc, K. Lutar and J. Slivnik, J. Fluorine Chem., 6 (1975) 287.