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THE INTERCALATION OF URANIUM HEXAFLUORIDE INTO GRAPHITE

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Intercalation of UF_6 into graphite, both from the gaseous phase and from the Ledon 113 solution, was studied. The amount of intercalated UF_6 from the gaseous phase was found to be inversely proportional to the size of graphite particles. Intercalation increases with the increasing temperature and surface area of graphite. The contact of gaseous UF_6 with graphite led to the formation of β-UF_5 that is not intercalated. In the Ledon solution β-UF_5 is not formed. 'Passivation' of graphite by elementary fluorine also prevents the formation of β-UF_5 but the amount of intercalated UF_6 decreases.

The intercalation of UF_6 into graphite from the gaseous phase is accompanied by the increase of the distance between the parallel carbon atom layers up to the values of about 884 pm. Ternary intercalates graphite -UF_6-Ledon 113 are formed during the intercalation of UF_6 from the Ledon 113 solutions and the distance between the parallel carbon atom layers 848-875 pm.

Thermogravimetry in the presence of air revealed that the binary intercalates graphite -UF_6 decompose in a 3-step reaction while the ternary intercalates decompose in a 4-step reaction. In both cases uranium hexafluoride is not released but acts as a fluorination agent on the graphite carbon.