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THE STUDY OF INTERACTION OF FLUORINE ATOMS WITH CHROMIUM AND ITS FLUORIDES

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The reaction of atomic fluorine with nonaqueous CrF_3 is accompanied by CrF formation. The presence of crystallized water in the initial CrF_3 leads to the change of the process mechanism and to the change of its direction. The interaction of fluorine atoms with $\text{CrF}_3 \cdot 4\text{H}_2\text{O}$, unlike the reaction with CrF_3 , is accompanied by the considerable heating of a solid reagent and by the formation of HF , CrO_2F_2 and O_2 . The mechanism of fluorination of $\text{CrF}_3 \cdot 4\text{H}_2\text{O}$ has been suggested on the basis of which the process starts with a strongly expressed exothermal reaction of the fluorine atoms with the crystallized water.

The interaction between the atomic fluorine and the solid CrF_5 is not observed in the temperature range of 90-273 K. It was found that the destruction of atoms on the reaction surface takes place under these conditions as a result of the recombination and attempt of obtaining CrF_6 has been failed.

The interaction of the atoms of fluorine with the solid chromium has been studied in the temperature range of 295-650 K. It was found that the recombination of atoms occurs up to 550 K on the metal surface, without evidence of the visible chemical interaction of fluorine with chromium. At a temperature above 550 K the metal ignition was observed in the atomic fluorine flow. Such substances in the reaction products as CrF_6 , CrO_2F_2 , CrOF_4 and CrF_x were found. The yield of various reaction products depends on the metal burning conditions and impurities of oxygen in fluorine.