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COMPOUNDS CONTAINING $C{=}SF_4$ AND $-C-\overset{+}{S}F_4$

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The preparations of $CH_2{=}SF_4$ and $CH_3{-}CH{=}SF_4$ are presented and the structures are discussed. Addition reactions of polar species give a wide range of new compounds, like $Hg(CH_2{-}SF_5)_2$, $F_4As{-}CH_2{-}SF_5$, cis-$Br{-}SF_4{-}CH_3$, cis-$F_5Se{-}O{-}SF_4{-}CH_2Br$, a.o. While $CH_2{=}SF_4$ decomposes at room temperature slowly to $CH_2{=}CH_2$ and SF_4, at high temperatures HF and CSF_2 are formed. $CH_3{-}CH{=}SF_4$ gives mainly CH_3CHF_2 at room temperature. The "saturated" compounds $CH_3{-}SF_5$ and $C_2H_5{-}SF_5$ have been prepared. They react with SbF_5 in SO_2 at low temperatures to form the cations $CH_3{-}SF_4^+$ and $C_2H_5{-}SF_4^+$. The $CH_3{-}SF_4^+$ ion has been investigated in detail by nmr methods at low temperatures. It decomposes to CH_3 and SF_4, which react further in the SO_2/SbF_5 system to $CH_3{-}OSO^+$ and SF_3^+.

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TRANSITION METAL CHLOROFLUORIDES

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Halogen exchange reactions between transition metal hexafluorides, MoF_6, WF_6, ReF_6 and IrF_6 with chlorides $TiCl_4$, $SnCl_4$, $SOCl_2$ and $SiCl_4$ have led to a wide range of products, many of which have not been reported previously, e.g. Mo(VI) Cl_xF_{6-x} series for Mo and Re; and $ReCl_6$ as a pale grey product, volatile at 150°C under vacuum.

The products were studied by mass spectrometry, n.m.r. spectroscopy (Mo VI) and single crystal X-ray crystallography.

The mass spectra showed the presence of multi-nuclear Re species, and all possible oxide chlorides of Re. The oxide chlorides, $ReOCl_3$ and $ReOCl_2$, and ReO_2Cl_2 have been prepared separately. Al powder was used as a reducing agent on the higher valency states.

Stabilisation of compounds by complexing with ligands: triphenyl phosphine oxide, and pentafluoroaniline and aniline has been investigated.