I-65

COMPOUNDS CONTAINING C=SF₄ AND -C-\$F₄

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The preparations of $\mathrm{CH_2=SF_4}$ and $\mathrm{CH_3-CH=SF_4}$ are presented and the structures are discussed. Addition reactions of polar species give a wide range of new compounds, like $\mathrm{Hg}(\mathrm{CH_2-SF_5})_2$, $\mathrm{F_4As-CH_2-SF_5}$, $\mathrm{cis-Br-SF_4-CH_3}$, $\mathrm{cis-F_5Se-0-SF_4-CH_2Br}$, a.o. While $\mathrm{CH_2=SF_4}$ decomposes at room temperature slowly to $\mathrm{CH_2=CH_2}$ and $\mathrm{SF_4}$, at high temperatures HF and $\mathrm{CSF_2}$ are formed. $\mathrm{CH_3-CH=SF_4}$ gives mainly $\mathrm{CH_3CHF_2}$ at room temperature. The "saturated" compounds $\mathrm{CH_3-SF_5}$ and $\mathrm{C_2H_5-SF_5}$ have been prepared. They react with $\mathrm{SbF_5}$ in $\mathrm{SO_2}$ at low temperatures to form the cations $\mathrm{CH_3-SF_4}^+$ and $\mathrm{C_2H_5-SF_4}^+$. The $\mathrm{CH_3-SF_4}^+$ ion has been investigated in detail by nmr methods at low temperatures. It decomposes to $\mathrm{CH_3}$ and $\mathrm{SF_4}$, which react further in the $\mathrm{SO_2/SbF_5}$ system to $\mathrm{CH_3-OSO}^+$ and $\mathrm{SF_3}^+$.

I-66

TRANSITION METAL CHLOROFLUORIDES

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Halogen exchange reactions between transition metal hexafluorides, MoF, WF, ReF, and IrF, with chlorides TiCl $_4$, SnCl $_4$, S0Cl $_2$ and SiCl $_4$ have led to a wide range of products, many of which have not been reported previously, e.g. Mo(VI) Cl F, 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, ReOCl₃ and ReOCl₂, and ReO₂Cl₂ have been prepared separately. All 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.