

behaves more like carbonmonoxide than like a common isonitrile. In the reaction of  $\text{Fe}_3(\text{CO})_{12}$  with  $\text{CF}_3\text{NC}$  the isonitrile bridged cluster  $\text{Fe}_3\mu\text{-CNCF}_3(\text{CO})_{11}$  is formed and can be isolated by column chromatography. In addition the reactions of  $\text{CF}_3\text{NC}$  with  $\text{SF}_5\text{Br}$ ,  $\text{SeF}_5\text{Cl}$ ,  $\text{TeF}_5\text{Cl}$  are presented.

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## COMPOSITION OF GAS HYDRATES OF $\text{CHClF}_2$ , $\text{CCl}_2\text{F}_2$ AND $\text{SF}_6$

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Gas hydrates are forms of ice stabilized by the presence of molecules of gas occupying cavities in the solid water lattice. There are two common forms: structure I and structure II. The mean free diameters of the two types of cavities in structure I are about 5.0 and 5.8 angstroms. Very small gas molecules such as Xe or  $\text{H}_2\text{S}$  can occupy both. In the past it has been considered that gas molecules of larger diameter than 5.0 angstroms could not occupy the smaller cavities. It has now been shown through measurement of hydration numbers of  $\text{CHClF}_2$  (diameter about 5.4 angstroms) under various pressures at  $0^\circ$ , that some of the small cavities are filled. This state of affairs also exists for  $\text{CH}_3\text{Br}$ . In structure II, the mean diameters of the two types of cavities are about 5.0 and 6.6 angstroms. Hydration numbers of  $\text{SF}_6$  (diameter about 5.8 angstroms) and  $\text{CCl}_2\text{F}_2$  (about 6.2 angstromsm) show that nearly all of the large cavities but essentially none of the small cavities are occupied.

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## $\text{ClF}_6^+$ AND $\text{ClF}_4^+$ CHEMISTRY

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Although the  $\text{ClF}_6^+$  cation is known to exist, it has previously been prepared only in the form of its  $\text{PtF}_6^-$  or  $\text{AuF}_6^-$  salts using very exotic fluorinating agents. A systematic study was carried out to determine the feasibility of preparing other more simple  $\text{ClF}_6^+$  salts and to provide improved synthetic methods. In addition, the vibrational spectra of  $\text{ClF}_4^+\text{SbF}_6^-$  were redetermined, and the assignments for  $\text{ClF}_4^+$  were revised and used for a normal coordinate analysis.