probably result from the use of different matrix gases and the presence of a neighboring HF molecule.

Three interesting observations can be made from the data. First, the reaction in all cases is induced by light in the visible, near-infrared regions. Second, one sees that trans 1,2-difluoroethane is a major product in fluorine matrices and that it readily converts to the more stable gauche isomer with matrix annealing to 30 K. Third, formation of vinyl fluoride is favored in dilute F_2-Ar matrices.

Table 1

Observed cm^{-1}	Known	Molecule	Ref.
1653	1656	vinyl fluoride[a])	[2]
1121 – 9	1145	vinyl fluoride	[2]
1092 – 8	1096	gauche[b])	[1]
1065	1070	gauche	[1]
1045	1048	trans[b])	[1]
924	934	vinyl fluoride	[2]
908	925	vinyl fluoride	[2]
890	891	gauche	[1]
875	869	vinyl fluoride	[2]

[a]) Frequencies given for a nitrogen matrix.
[b]) 1,2-difluoroethane.

Conclusions

Infrared spectra indicate CH_4, C_2H_6, C_2H_4, and C_2H_2 can be isolated in solid fluorine in the dark without reaction, but ethylene and fluorine undergo a photolytic reaction with visible, near-infrared radiation to form vinyl fluoride, or gauche and trans 1,2-difluoroethane. Data suggest reaction of a single fluorine molecule favors vinyl fluoride formation. Formation of trans 1,2-difluoroethane is favored at high fluorine concentration, i.e. in a fluorine matrix, presumably through a difluorine ethylene complex.

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E 3800

Photochemical Oxidation of Iodosilane in Solid Argon

J. F. Ogilvie,

University of Kuwait

V. R. Salares, and M. J. Newlands

Memorial University of Newfoundland, Canada

Absorptionsspektren, Infrarot / Molekülstruktur / Photochemie

The photochemical decomposition of iodosilane, alone or in the presence of oxygen, in argon matrices at 4 – 8 K has been studied by methods similar to those used previously for iodomethane (Canad. J. Chem., *53*, 269 (1975)). Vibrational absorption spectroscopy has been used to detect the formation of iodosilyl radicals and oxygenated iodosilane derivatives. The use of deuterated iodosilane and oxygen-18 has permitted identification of structures of likely products. Attribution of absorption lines to the various species has been possible through the use of high- and low-pressure mercury lamps which produce different sets of line intensities. The effect of the relative concentration of oxygen also aids in product identification. The formation of ozone and the production of photochemical explosions with silane/ozone mixtures at 4 K will be discussed.

E 3867

Metal Atom Olefin Chemistry; Interaction of Group VIII Metal Atoms with Ethylene

Geoffrey A. Ozin and William J. Power

Lash Miller Chemistry Laboratory and Erindale College, University of Toronto, Toronto, Ontario, Canada

Absorptionsspektren, Infrarot

The existence of binary complexes of the form $Ni(ol)_n$ was first demonstrated by Wilke et al. [1] from the reaction of $Ni(COD)_2$ and C_2H_4 at 77 K, to form $Ni(C_2H_4)_3$; this complex was subsequently synthesized directly by metal vapour techniques in the temperature range 77 – 10 K [2, 3a, 3b], and further characterized by various spectroscopic methods. Standard matrix dilution and warm-up experiments, under metal concentration conditions designed to procedure mononuclear complexes, allowed the isolation and characterization of the reactive intermediates $Ni(C_2H_4)$ and $Ni(C_2H_4)_2$ [3a]. This area of research was extended to other