FOURIER TRANSFORM INFRARED STUDIES OF THE VIBRATIONAL SPECTRA OF HYDROGEN BEARING SILICON-CARBON CLUSTERS IN Ar AT 10 K [a]

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Fourier transform infrared studies of small hydrogen bearing silicon-carbon clusters trapped in solid Ar have resulted in the identification of new species. Among those so far investigated is the linear SiCCH radical produced from the products of the vacuum ultraviolet photolysis of a mixture of $SiH_4$ silane, and $C_2H_2$ acetylene. Two fundamentals of SiCCH have been abserved, the $\nu_2(\sigma)$, carbon-carbon stretching mode at 1989.8 $cm^{-1}$ and the $\nu_3(\sigma)$, silicon-carbon stretching mode at 636.0 $cm^{-1}$. Also investigated is SiCH produced by the photolysis of $SiH_4$ and $CH_4$ methane. The identification of vibrational modes and determination of structures for these species is based on comparison of measured frequencies, relative intensities, and the results of extensive measurements of D and $^{13}C$ isotopic shifts with the results of *ab initio* calculations performed in conjunction with this work .

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