FTIR Argon Matrix and DFT Study of the Vibrational Spectrum of SiC$_5$\textsuperscript{1} T.H. LE, W.R.M. GRAHAM, Texas Christian University, TCU MOLECULAR PHYSICS LAB TEAM — This is the first Fourier transform infrared (FTIR) study on SiC$_5$, which is a part of ongoing FTIR and density functional theory (DFT) research, investigating the structures and vibrations of silicon-carbon molecules. Vibrational spectra of SiC$_5$ were obtained by Nd:YAG laser ablation of a sintered rod, made of $^{13}$C-enriched graphite and silicon, and trapping the resulting vapor in solid Ar at $\sim$15 K. The $\nu_4(\sigma_u)$ asymmetric stretching fundamental of SiC$_5$ has been observed at 936.9 $\pm$ 0.2 cm$^{-1}$. The measured isotopic shifts are in good agreement with the predictions of DFT calculations. This information will help in identifying SiC$_5$ in circumstellar and interstellar environments. Also, it has potential applications for optoelectronic and semi-conductor devices.

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