HIGH RESOLUTION INVESTIGATION OF SILACYCLOBUTANE USING FTMW AND SYNCHROTRON BASED FTIR SPECTROSCOPY

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The rotational spectrum of silacyclobutane (c-C_3H_8Si) has been measured between 8 and 24 GHz using Fourier transform microwave spectroscopy. Although the microwave spectrum was previously reported[a], the current study is the first observation of tunneling splitting in the ground state due to ring puckering. The observed transitions within each tunneling state obey *a*-type selection rules and *c*-type transitions that connect the inversion states have also been observed. The rotational constants determined were used to model the rotational structure of several vibrational bands of silacyclobutane including the weak ring puckering mode at 157 cm^{-1}. The far infared spectrum of silacyclobutane was recorded using the far infrared beamline at the Canadian Light Source and includes multiple tunneling doubled bands. The ongoing analysis of the incredibly rich vibrational spectrum of silacyclobutane will be discussed.

[a] W. C. Pringle *J. Chem. Phys.* **54** (4979), 1971.