A HIGH RESOLUTION FAR INFRARED STUDY OF LOW LYING VIBRATIONAL BANDS OF 3-OXETANONE

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Rotationally resolved vibrational spectra of the four lowest frequency bands of the four-membered heterocycle 3-oxetanone (c-$C_3H_4O_2$) have been collected with a resolution of 0.00096 cm^{-1} using the far infrared beamline at the Canadian Light Source synchrotron. The modes observed correspond to motions best described as: ring puckering v_{21} at 139.55 cm^{-1}, C=O deformation (out-of-plane) v_{20} at 399.59 cm^{-1}, C=O deformation (in-plane) v_{16} at 448.19 cm^{-1}, and the ring deformation v_7 at 684.99 cm^{-1}. The observed spectra exhibit rich spectroscopic features including hot bands originating from the low energy ring puckering band and a first order *a-type* Coriolis interaction between the closely spaced v_{16} and v_{20} bands. The assignment and analysis of these dense spectra will be presented.