FAR-INFRARED SYNCHROTRON-BASED SPECTROSCOPY OF FURAN: ANALYSIS OF THE $\nu_{14} - \nu_{11}$ PERTURBATION AND THE $\nu_{18}$ AND $\nu_{19}$ LEVELS

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The $\nu_{14}$ vibrational level of furan lies 603 cm$^{-1}$ above the ground vibrational state. It is the lowest lying vibrational level for which a transition from the ground state is allowed. Other groups have conducted rotational analyses on fundamental bands of furan at 745 cm$^{-1}$ ($\nu_{13}$), 995 cm$^{-1}$ ($\nu_{7}$), and at 1067 cm$^{-1}$ ($\nu_{6}$). We have taken the rotationally resolved spectrum of the $c$-type $\nu_{14}$ band at the Canadian Light Source synchrotron with a Bruker IFS125HR Fourier transform spectrometer operating at 0.00096 cm$^{-1}$ resolution, and have found it to be perturbed by the $\nu_{11}$ band at 600 cm$^{-1}$, for which transitions from the ground vibrational state are forbidden. By taking the spectra of the $b$-type $\nu_{18}$ fundamental band and of the very weak $c$-type $\nu_{18} - \nu_{11}$ band we have been able to analyze the $\nu_{14} - \nu_{11}$ perturbation. We have also analyzed the spectrum of the $b$-type $\nu_{19}$ fundamental band.

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