SATURATION-DIP MEASUREMENTS IN THE ν_8 C-O STRETCHING FUNDAMENTAL BAND OF METHANOL WITH A DUAL-MODE CO_2-LASER/MICROWAVE-SIDEBAND SPECTROMETER

Z.-D. SUN, *Department of Physical Sciences, University of New Brunswick, Saint John, NB, Canada E2L 4L5;Department of Physics, Yantai University, 264005, P. R. China*; R.M. LEES, and L.-H. XU, *Department of Physical Sciences, University of New Brunswick, Saint John, NB, Canada E2L 4L5*.

We have extended the sub-Doppler spectroscopic study of the ν_8 C-O stretching fundamental band of methanol with a dual-mode CO_2-laser/microwave-sideband spectrometer[a]. A further 492 transitions, including a number of overlapped and doublet lines unresolved in the Doppler-limited spectra of the broadband scanning mode, have been observed as saturation dips with a resolution of 0.4 MHz in the sub-Doppler detection mode and their frequencies have been measured with accuracy of order $\pm$200 kHz. For K from 1 to 5, energy term values for the excited-state levels of these A- and E-species transitions have been determined using known ground-state energies and have been fitted to Taylor-series expansions in powers of $J(J+1)$ to yield accurate expansion coefficients. The present, together with previous sub-Doppler measurements[a,b], provide a high accuracy database for CH_3OH, with application to methanol vibrational interaction studies and the interpretation of the optically pumped far-infrared laser emission spectrum.

[a]Z.-D. Sun, R.M. Lees, L.-H. Xu, M.Yu. Tretyakov, and V.V. Dorovskikh, Rev. Sci. Instrum. **75**, 1052 (2004).
[b]Z.-D. Sun, F. Matsushima, S. Tsunekawa, and K. Takagi, J. Opt. Soc. Am. B **17**, 2068 (2000).