

LINE INTENSITY AND LINEWIDTH STUDIES OF THE OXYGEN A-BAND USING INTRACAVITY LASER ABSORPTION SPECTROSCOPY

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Intracavity Laser Absorption Spectroscopy (ICLAS) was utilized to observe the $b^1\Sigma_g^+ \leftarrow X^3\Sigma_g^-$ ($\nu=0 \leftarrow \nu=0$) transition of the oxygen A-band at 765 nm. The use of the high sensitivity of ICLAS (approx. 10^{-9} cm $^{-1}$) for the measurement of line intensities, linewidths, and line broadening coefficients of weakly absorbing atmospheric species is demonstrated. Effective absorption pathlengths on the order of 10 km were utilized to measure line intensities and self-broadening coefficients of high J lines (up to J=39) as well as low J lines of the hot band (1 \leftarrow 1). In addition, line intensity and nitrogen broadening coefficients were obtained for the mixed isotope of oxygen ($^{16}\text{O}^{18}\text{O}$) and compared with the corresponding values for $^{16}\text{O}_2$. These values, as well as recent developments of a correlated double-sampling ICLA spectrometer, will be reported.