# ABSOLUTE LINE WAVENUMBERS IN THE NEAR INFRARED: $^{12}C_2H_2$ and $^{12}C^{16}O_2$ [a]

J. VANDER AUWERA and R. EL HACHTOUKI, *Laboratoire de Chimie Physique Moléculaire C. P. 160/09, Université Libre de Bruxelles, 50 Avenue F. D. Roosevelt, B-1050 Brussels, Belgium*; L. R. BROWN, *Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California 91109.*

We obtained 40 absolute line wavenumbers in the $3\nu_3$ band of $^{12}C^{16}O_2$ between 6927 and 6989 $cm^{-1}$ and more than 600 absolute line wavenumbers in the near infrared absorption spectrum of $^{12}C_2H_2$ between 7060 and 9900 $cm^{-1}$ using high-resolution Fourier transform spectroscopy. The calibration of the $CO_2$ line wavenumbers relied on heterodyne frequencies available in the $\nu_1 + \nu_3$ band of $^{12}C_2H_2$ near 6556 $cm^{-1}$. We have calibrated the acetylene spectra using heterodyne frequencies available in the $2 - 0$ band of $^{12}C^{16}O$ and the line wavenumbers obtained in the $3\nu_3$ band of $^{12}C^{16}O_2$. Comparison with absolute line wavenumbers obtained independently at JPL in the $3\nu_3$ band of $^{12}C_2H_2$ near 9649 $cm^{-1}$, calibrated using absolute wavenumbers available in the $2 - 0$ and $3 - 0$ (near 6350 $cm^{-1}$) bands of $^{12}C^{16}O$, shows good agreement. Finally, we have also determined vibration-rotation constants for the observed upper vibrational states of $^{12}C_2H_2$, without accounting for the perturbations affecting these states however.

[a]Part of the research described in this paper was carried out by the Jet Propulsion Laboratory, California Institute of Technology, under contract with the National Aeronautics and Space Administration.