

## HIGH RESOLUTION ANALYSIS OF H<sub>2</sub>CO IN THE 3.6 and 4.3 $\mu\text{m}$ REGION BY FOURIER TRANSFORM SPECTROSCOPY

A. PERRIN, J.-M. FLAUD, *Laboratoire de Photophysique Moléculaire, CNRS, Université Paris Sud, Campus d'Orsay, Bat 210, 91405 Orsay Cedex, France*; A. VALENTIN, C. CAMY-PEYRET, *Laboratoire de Physique Moléculaire et Applications, C.N.R.S., Université Pierre et Marie Curie, Tour 13, 4 Place Jussieu, 75252 Paris, Cedex 05, France*; L. R. BROWN, *Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, USA*.

Using new Fourier transform spectra recorded at high resolution at LPMA Paris, it has been possible to perform an extensive study of the formaldehyde absorption spectra in the 2600-3000 $\text{cm}^{-1}$  and in the 2200-2500 $\text{cm}^{-1}$  spectral ranges. This analysis was started using the results obtained previously in the same spectral regions <sup>a b</sup> and by using the ground state parameters of Bocquet et al <sup>c</sup>. In this way, more than 9000 lines were identified which belong to 10 bands of formaldehyde. From this analysis it appears that these bands should not be considered as independent.

Actually in the high frequency range, the analysis of the strongest bands, namely  $\nu_1$  and  $\nu_5$  (symmetric and antisymmetric stretching modes) was complicated by the existence of Fermi-type resonances and by A-type, B-type and C-type Coriolis interactions with various overtone or combination states namely  $\nu_2 + \nu_6$ ,  $2\nu_3$ ,  $\nu_2 + \nu_4$ ,  $\nu_3 + \nu_6$  and  $\nu_3 + \nu_4$ .

Moreover the analysis was also complicated by additional perturbations due to the weak  $2\nu_4$  and  $2\nu_6$  bands and to the very weak  $\nu_4 + \nu_6$  band which appear in the low frequency range. The final calculation which involves about 2600 levels belonging to 10 different states leads to rather reasonable results, given the difficulty of the problem.

---

<sup>a</sup>L. R. Brown, R. H. Hunt, and A. Pine, *J. Mol. Spectrosc.* **75**, 406 (1979).

<sup>b</sup>F. Ito, T. Nakanaga, and H. Takeo, *Spectrochimica Acta.* **50A**, 1397 (1994).

<sup>c</sup>R. Bocquet, J. Demaison, L. Poteau, M. Liedtke, S. Belov, K. M. T. Yamada, G. Winnewisser, C. Gerke, J. Grip and Th. Kohler, *J. Mol. Spectrosc.* **177**, 154 (1996) and J. Demaison (private communication)