HIGH-RESOLUTION LASER PHOTOACOUSTIC SPECTROSCOPY OF PH_3: THE FIFTH P-H STRETCHING OVERTONE BANDS.

T.R. HUET,F. HERREGODTS, *Laboratoire PhLAM, Universite de Lille 1, F-59655 Villeneuve d'Ascq Cedex, France*; W. JERZEMBECK, *Anorganische Chemie, FB9, Universitat-Gesamthoschschule, D-42087 Wuppertal, Germany*; and I. KLEINER, *CNRS, Laboratoire de Photophysique Moleculaire, F-91405 Orsay Cedex, France*.

The fifth P-H stretching overtone bands of phosphine are currently investigated. The spectrum was recorded at room temperature with a gas pressure of 116 hPa between 12 500 and 12 780 cm^{-1}.The spectrometer is a titanium:sapphire ring laser (Coherent 899-29) pumped by an Innova 400, 15 W argon-ion laser, which is coupled to a high sensitivity acoustic cell (α_{min} = 5x10^{-9} cm^{-1}) filled with gas. Most spectra were recorded with a laser power of 1.5 W, a time constant of 300 ms, and a typical sensitivity of 100-500 μV. The spectrum of phosphine has been recorded at room temperature with a gas pressure of 116 hPa between 12 500 and 12 780 cm^{-1}.
The Δv=6 spectrum is characterized by one band system centered at 12 678.2 cm^{-1}. It is assigned to the local mode P-H stretching (600 A_1/E) bands. The analysis started by locating the most intense ${}^{r}R_K$(J) and ${}^{p}P_K$(J) lines (with K=J) and the ${}^{r}Q_0$(J) lines of the perpendicular band, using the ground state combination differences technique. The ground state constants were kept fixed to the values from the litterature (L. Fusina and G. Di Lonardo, *J. Mol. Struct.* 517-518 (2000) 67-78). Lines up to J=0-6 have been assigned. Last year a Hamiltonian model which makes use of simple arithmetic relations between some rovibrational parameters was used and a preliminary set of parameters was obtained. The molecular parameters seemed to confirm the local mode tendency of the PH_3 molecule in the near infrared range. We are now attempting to reach the experimental accuracy. A C_{3v} model is used to take into account the vibration-rotation perturbations.
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