MICROWAVE AND SUBMILLIMETER WAVE MEASUREMENTS OF HDCO IN THE ν_4, ν_5 AND ν_6 BANDS

A. PERRIN, J.-M. FLAUD, *Laboratoire de Photophysique Moléculaire, CNRS, Université Paris Sud, Campus d'Orsay, Bat 350, 91405 Orsay Cedex, France*; J.DEMAISON, L.MARGULÈS, *Laboratoire PhLAM, CNRS, Université de Lille I, Bat. P5, 59655 Villeneuve d'Ascq Cedex, France*; H. MÄDER, S.WÖRMKE, *Institut für Physikalische Chemie, Olshausenstrasse 40, D-24098 Kiel, Germany*.

The rotational spectrum of HDCO in the 4^1, 5^1 and 6^1 excited vibrational states has been investigated in Lille and Kiel using a sample enriched in D. In Lille the measurements were performed in the millimeter (160-600 GHz) region. The spectra in Kiel were recorded using Fourier transform microwave spectrometers in the regions of about 8-18 GHz and 18-26 GHz, employing a rectangular waveguide of 12 m length and a circular waveguide of 36 m length, respectively. These results were combined with the 4^1, 5^1 and 6^1 infrared energy levels [a] obtained in a previous analysis of FTS spectra of the ν_4 band (CHD bend), ν_5 band (CHD rocking) and ν_6 band (out of plane bend) recorded in the 10 μm region at Giessen in order to get the best possible Hamiltonian constants.
The energy levels calculation of the 4^1, 5^1 and 6^1 interacting states accounts for the usual A- and B-type Coriolis resonances in the 5^1 - 6^1 and 6^1 - 4^1 off diagonals blocks. On the other hand, in order to reproduce the observed microwave transitions and infrared energy levels, it was necessary to use a $\{J_x, J_z\}$ non orthorhombic term in the 5^1 and 6^1 v- diagonal blocks of the Hamiltonian matrix. Therefore, HDCO exhibits an example of vibrational induced rotational axis switching.

[a] A. Perrin, J.-M.Flaud, M.Smirnov, and M.Lock, J. Mol. Spectrosc. 203, 175 (2000).