

## MICROWAVE AND SUBMILLIMETER WAVE MEASUREMENTS OF HDCO IN THE $\nu_4$ , $\nu_5$ AND $\nu_6$ BANDS

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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<sup>a</sup> obtained in a previous analysis of FTS spectra of the  $\nu_4$  band (CHD bend),  $\nu_5$  band (CHD rocking) and  $\nu_6$  band (out of plane bend) recorded in the 10  $\mu\text{m}$  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.

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<sup>a</sup>A. Perrin, J.-M.Flaud, M.Smirnov, and M.Lock, *J. Mol. Spectrosc.* **203**, 175 (2000).