STRONG VIBRONIC COUPLING IN THE VISIBLE SYSTEMS OF YOH AND YOD

A. G. ADAM, *Department of Chemistry, University of New Brunswick, Bag Service 45222, Fredericton, N.B. E3B 6E2, Canada*; K. ATHANASSENAS, C. T. KINGSTON, A. J. MERER, J. R. D. PEERS, S. J. RIXON, *Department of Chemistry, University of British Columbia, 2036 Main Mall, Vancouver, B.C. V6T 1Z1, Canada*; and D.A. GILLETT, *Lambda-Physik, Inc., 3201 West Commercial Blvd., Fort Lauderdale, FL 33309*.

Extensive new spectra have been taken for the visible systems of YOH and YOD, in an attempt to establish the vibrational assignments in the very confused $\tilde{B}^1\Pi$ and $\tilde{C}^1\Sigma^+$ states. It turns out that there is very strong vibronic coupling through the bending vibration between the $\tilde{C}^1\Sigma^+$ state and the A' (lower) Born-Oppenheimer component of the $\tilde{B}^1\Pi$ state. The effect is that the bending frequency of the $\tilde{C}^1\Sigma^+$ state is increased by 50% relative to the ground state, while that of the A' component of the $\tilde{B}^1\Pi$ state is reduced so far that the molecule becomes non-linear, with a potential barrier of about 120 cm^{-1} at the linear configuration; the A'' (upper) component of the $\tilde{B}^1\Pi$ state is not affected. The principal evidence for the barrier is that the 010 Σ^+ vibronic level lies 1.4 cm^{-1} *below* the 000 level (linear molecule notation) in the $\tilde{B}^1\Pi$ state of YOD. The density of the level structure in the $\tilde{C}^1\Sigma^+$ state arises partly because higher levels of the $\tilde{B}^1\Pi$ state lying among the levels of the $\tilde{C}^1\Sigma^+$ state gain intensity through the vibronic coupling.