AN EXPERIMENTAL DETERMINATION OF ANHARMONIC TERMS IN THE VIBRATIONAL HAMILTONIAN OF HCO^+.

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We report a harmonic frequency ω_2 = 842.464 cm^{-1}, an anharmonic constant, x_{22} = -3.15 cm^{-1} and a vibrational angular momentum splitting constant g_{22} = 3.22 cm^{-1} for the ground state $^1\Sigma^+$ for HCO^+. The constants are calculated based on experimentally measured Rydberg Series from the $3p\pi$ electronic state which converge to the rovibrational thresholds of the cation (00^00), (01^10), (02^00) and (02^20). Along with these thresholds, we use the experimentally measured x_{23} anharmonic constant from Oka *et al.* and the theoretical x_{12} anharmonic constant from Puzzarini *et al.* and Lee *et al*. To further characterize the bending coordinate anharmonicity of the potential energy surface of HCO^+, we assign Rydberg series obtained from the $3p\pi\ ^2\Pi\,(030)\,\Sigma^-\ N' = 0$ and 2 converging to rovibrational thresholds (03^10) and (03^30) in the cation. ¿From this extrapolation, we refine our anharmonic constants for the ground electronic state for HCO^+.