OPTICAL STARK SPECTROSCOPY OF CHLORO-METHYLENE, HCCl

XIUJUAN ZHUANG AND TIMOTHY C. STEIMLE, *Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ 85287*; ZHONG WANG, *Math and Sciences Department, Suffolk County Community College,East Campus, Riverhead, NY, 11901*.

The optical spectrum of chloro-methylene, HCCl, has been studied for more than 40 years by both conventional[a] and laser-based[bcd] spectroscopy. Surprisingly, numerous visible bands have yet to be characterized, due in part to known perturbations. Furthermore, the permanent electric dipole moment, μ_{el}, for any state has yet to be determined. Here we report on the field-free and optical Stark spectrum of the $\tilde{A}^1A''(060)-\tilde{\mathrm{X}}^1A'(000)$ band system. A cold molecular beam sample was produced by skimming the output of a pulsed discharge source and the spectrum recorded at a resolution of approximately 30 MHz via LIF detection. The field-free spectrum was analyzed to produce an improved set of spectroscopic parameters for the $\tilde{A}^1A''(060)$state. The Stark induced shifts were analyzed to determine the values of the a-component of μ_{el} for the $\tilde{X}^1A'(000)$state of 0.498(8)D. Small perturbations in the $\tilde{A}^1A''(060)$state will be described.

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