

NEW ELECTRONIC SPECTRA OF THE HCCI/DCCI $\tilde{A}-\tilde{X}$ VIBRONIC BANDS

CHIA-SHIH LIN, YING-EN CHEN, and BOR-CHEN CHANG, *Department of Chemistry, National Central University, Chung-Li 32054, Taiwan.*

We have successfully acquired new dispersed fluorescence spectra following the excitation of several $\tilde{A}-\tilde{X}$ vibronic bands of HCCI and DCCI at visible wavelengths in a discharge free jet expansion using an intensified charge-coupled device (ICCD) detector. The new dispersed fluorescence spectra reveal more details of the $\tilde{X}^1 A'$ state vibrational structure in these molecules than our previous reports.^{a, b} Complete vibrational parameters including fundamental frequencies, anharmonicities, and coupling constants were determined for the HCCI/DCCI $\tilde{X}^1 A'$ state. Furthermore, perturbations from the background triplet state ($\tilde{a}^3 A''$) were clearly observed in the new dispersed fluorescence spectra, and therefore the singlet-triplet energy gap could be determined. Additionally, a couple of new $\tilde{A}-\tilde{X}$ vibronic bands were found in the laser excitation spectra of HCCI and DCCI. The rotationally resolved excitation spectra of a few HC^{35}Cl $\tilde{A}-\tilde{X}$ vibronic bands and those of HC^{37}Cl were recorded and analyzed. Our progress on the experiments and analyses will be presented.

^aC.-W. Chen, T.-C. Tsai, and B.-C. Chang, *Chem. Phys. Lett.* **347**, 73 (2001).

^bC.-L. Lee, M.-L. Liu, and B.-C. Chang, *J. Chem. Phys.* **117**, 3263 (2002).