NEW DISPERSED FLUORESCENCE SPECTRUM OF THE CBr_2 $\tilde{A}$–$\tilde{X}$ TRANSITION

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New dispersed fluorescence spectra following the excitation of the CBr_2 $\tilde{A}^1B_1 \leftarrow \tilde{X}^1A_1$ 2_0^{13} and 2_0^{14} bands at visible wavelengths in a discharge free jet expansion were acquired using an intensified charge-coupled device (ICCD) detector. The new dispersed fluorescence spectra show an improvement of the signal-to-noise ratios by a factor of roughly 10 with respect to our previous report.[a] These new data extend the scan range from the maximum redshift of 2500 cm^{-1} in our previous report[a] to 6000 cm^{-1} and reveal more details of the $\tilde{X}^1A_1$ state vibrational structure. Vibrational parameters including fundamental frequencies, anharmonicities, and coupling constants were determined for the CBr_2 $\tilde{X}^1A_1$ state. Moreover, additional vibrational structures, other than that of the singlet ground electronic state, starting at approximately 2725 cm^{-1} were clearly observed in the new dispersed fluorescence spectra. Since these additional vibrational structures possibly belong to the background triplet state ($\tilde{a}^3B_1$), the singlet-triplet energy gap could be determined. Our progress on the experiments and analyses will be presented.

[a] C.-L. Lee, M.-L. Liu, and B.-C. Chang, *Phys. Chem. Chem. Phys.* 5, 3859-3863 (2003).