STUDY OF PHENYLACETYLENE BY CAVITY RING-DOWN SPECTROSCOPY

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Cavity ring-down (CRD) measurements have been made on the $S_1(\tilde{A}\ ^1B_2) \leftarrow S_0(\tilde{X}\ ^1A_1)$ absorption spectrum of slit jet-cooled phenylacetylene (PA) in the 279 nm region as a further investigation of the photophysical properties of PA reported by Hosftein et al.[b] The intensities in the new CRD data are compared with those obtained in the old REMPI experiments, and computational models.[c] The results show that the strong bands in the REMPI spectrum are attenuated while the weak bands (a_1 modes) remained the same when compared to CRD spectra. The comparison of the simulated spectrum to the CRD and REMPI spectra were satisfactory for most part when the a_1 modes were scaled up by a factor of 3.24 and 3.55, respectively, giving evidence of some possible theoretical artifacts.[c] The temperature of the slit jet-cooled PA was found to be in the range of 30 ± 5K by comparison with simulations of the rotational structure of the band origin of the $S_1 \leftarrow S_0$ transition. Additionally, many hot bands located near the band origin of the this transition have been assigned.

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