HIGH RESOLUTION ELECTRONIC SPECTROSCOPY OF 9,10-DIHYDROPHENANTHRENE [a]. STUDY OF THE INVERSION MOTION OF A FLOPPY MOLECULE IN THE GAS PHASE [b]

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Rotationally resolved $S_1 \leftarrow S_0$ fluorescence excitation spectra of 9,10-dihydrophenanthrene (DHPH) have been studied in a collision-free molecular beam environment. DHPH exhibits two well defined Franck-Condon progressions of vibronic bands. From the analyses of its fully resolved electronic spectra, the first progression has been assigned to the out of plane CH_2-CH_2 bridge deformation inversion motion of the molecule. The second progression, split into doublets of alternating intensities, is likely to be caused by combination of vibrational modes upon excitation. Detailed information about the assignments and inversion barriers in both electronic states will be discussed.

[a] M. Z. Zgierski, F. Zerbetto, Y. Shin, and E. C. Lim, J. Chem. Phys. 96 (10), 1992, pp 7229.

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