LASER INDUCED FLUORESENCE SPECTROSCOPY OF THE JET-COOLED TRANSIENT SPECIES AsD_2 AND AsHD

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The $\tilde{A}^2A_1 - \tilde{X}^2B_1$ electronic band system of the AsD_2 and AsHD free radicals has been observed by laser induced fluorescence (LIF) spectroscopy. AsD_2 (or AsHD) was produced in a pulsed supersonic expansion by electric discharge dissociation of a mixture of 5% AsD_3 (or AsH_xD_{3-x} mixture) seeded in argon. Single vibronic level emission spectra have been obtained for both AsD_2 and AsHD. The observed LIF transitions of AsD_2 in the 411 - 505 nm region exhibit a long progression in the excited state bending vibration. High-resolution rotationally resolved spectra of the 0_0^0 band of AsD_2 were also recorded. This c-type band shows prominent $\Delta K_a = \pm 3$ transitions due to the large change in the asymmetry parameter upon electronic excitation. Extensive hyperfine splittings were resolved which allowed the determination of the excited state Fermi contact parameter. The data have been used to refine the molecular structure of the AsH_2 radical.