ELECTRONIC SPECTROSCOPY OF THE JET-COOLED HPBr FREE RADICAL

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The $\tilde{A}^2A'$ - $\tilde{X}^2A''$ electronic transition of the HPBr free radical has been observed for the first time by laser induced-fluorescence (LIF) spectroscopy in the 480 - 430 nm region. HPBr and DPBr were generated in a pulsed discharge jet using a precursor mixture of PBr_3 and H_2 or D_2 in argon. At low resolution the bands have the characteristic rotational contour of a perpendicular transition of an asymmetric top, and a band-dependent bromine isotope effect in an approximate 1:1 ratio of $HP^{79}Br$ and $HP^{81}Br$. The analysis of the spectra, rotational constants, vibrational frequencies, molecular geometries and the results of $ab\ initio$ calculations of the molecular parameters will be discussed.