# THE ELECTRONIC SPECTRUM AND MOLECULAR STRUCTURE OF THE ARSENYL ($H_2As$=O) FREE RADICAL

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The $H_2As$=O radical has been identified for the first time by laser-induced fluorescence (LIF) and single vibronic level (SVL) emission techniques. The radical was generated by a pulsed electric discharge in a mixture of $AsH_3$ and $CO_2$ and high-pressure argon and detected by observation of the $\tilde{B}^2A' - \tilde{X}^2A'$ electronic transition in the 510-410 nm region. Moderate resolution LIF and SVL emission spectra of $H_2AsO$, $D_2AsO$, and HDAsO have been recorded and analysis shows unequivocally that the spectrum is due to the arsenyl radical. High-resolution spectra of the $0_0^0$ bands of $H_2AsO$ and $D_2AsO$, which consist of strong $a$-type and weaker $c$-type transitions, revealed spin-splittings and small, but significant arsenic hyperfine splittings due to a Fermi contact interaction in the ground state. The effective molecular structures of $H_2AsO$ in the ground and excited states have been determined from the rotational constants and will be discussed in the context of the analogous nitroxyl ($X_2N$=O) and phosphonyl ($X_2P$=O) radicals.