

ELECTRONIC SPECTROSCOPY OF JET-COOLED HCP⁺

FUMIE X. SUNAHORI, XIAOPENG ZHANG, AND DENNIS J. CLOUTHIER, *Department of Chemistry, University of Kentucky, Lexington, KY 40506-0055.*

Laser-induced fluorescence spectra of jet-cooled HCP⁺ and DCP⁺ have been obtained with the pulsed discharge technique using HCP/DCP and argon precursor mixtures. Most of the excited state vibrational fundamentals have been observed and a set of vibrational constants obtained. High resolution spectra of the ²Π_{3/2} components of the 0₀⁰ bands of both isotopomers have been recorded, and these spectra show resolved phosphorus hyperfine structure which allowed the determination of the excited state Fermi contact parameter. The *B* values were used to obtain the ground and excited state effective geometric parameters as $r''_0(\text{CH}) = 1.077(2) \text{ \AA}$, $r''_0(\text{CP}) = 1.6013(3) \text{ \AA}$, $r'_0(\text{CH}) = 1.082(2) \text{ \AA}$ and $r'_0(\text{CP}) = 1.5331(3) \text{ \AA}$. The ground state vibrational energy levels reported in the literature were fitted to a Renner-Teller hamiltonian that included the effects of angular momentum coupling as well as spin-orbit, vibrational anharmonicity and Fermi resonance effects.