INFRARED SPECTRA OF MOLECULAR IONS FORMED FROM PF_3 AND PF_5 AND TRAPPED IN A NEON MATRIX

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When PF_3 or PF_5 is subjected to Penning ionization and photoionization by excited neon atoms and their resonance radiation (16.6-16.8 eV) and the products are rapidly frozen in an excess of solid neon, the resulting solid deposit shows prominent infrared absorptions which can be assigned to cation and anion products, including PF_3^+, PF_4^+, and PF_4^-. Because phosphorus and fluorine each possess only one stable isotope, consideration of the spectra of related systems and of the results of ab initio calculations is important in making spectral assignments. Processes which lead to the stabilization of the observed ionic species will be discussed.