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Positron-molecule binding energies measured via resonances in annihilation[1] J.A. YOUNG, Jet Propulsion Lab, C.M. SURKO, Univ. of California, San Diego — Measurements of positron-molecule annihilation using a monoenergetic positron beam have revealed distinct features due to vibrational Feshbach resonances (VFR). The presence of these features implies the existence of positron-molecule bound states. The shifts in the energies of the resonant peaks from those of the vibrational modes provides a measure of the binding energies. In this paper, we present positron-molecule affinity data for thirty molecular species, which range from < 1 meV for small molecules such as ethane and ethylene to more than 300 meV for hexadecane and naphthalene. We relate these positron affinities to various physical parameters such as polarizability, ionization potential and dipole moment [1]. We also describe recent results of a quantitative theoretical model for VFR-mediated positron attachment to small molecules [2, 3].
[1] J. A. Young & C. M. Surko, *Phys. Rev. A*, **77**, 052704 (2008).
[2] G. F. Gribakin & C. M. R. Lee, *Phys. Rev. Lett.*, **97**, 193201 (2006).
[3] J. A. Young, C. M. Surko, G. F. Gribakin, & C. M. R. Lee, *Phys. Rev. A*, in press (2008).

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