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Dependence of positron-molecule binding energies on molecular parameters[1] J.R. DANIELSON, J.A. YOUNG, C.M. SURKO, University of California, San Diego — Studies of positron annihilation on many molecules show evidence of vibrational Feshbach resonances and thus provide evidence that positrons bind to these species. The downshifts in the resonances from the mode energies provide a measure of the binding energy.[2] Regression analysis on the existing data set of 30 such molecules indicates that the binding energy can be expressed as a linear combination of the molecular dipole polarizability and the permanent dipole moment with an additional term for aromatics that is proportional to the number of π bonds. This result is compared with binding energy calculations and tested with other annihilation data. Predictions of the model are discussed, including positron binding to atomic clusters, polycyclic aromatic molecules (PAHs), and other chemical species. The relationship of these positron-molecule bound states to analogous electron-molecule states is also discussed.[3]

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[2]J. A. Young and C. M. Surko, Phys. Rev. A **77**, 052704 (2008); and Phys. Rev. A **78**, 032702 (2008).
[3]H. Abdoul-Carmine and C. Desfrancios, European Phys. J. **2**, 149 (1998).

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