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Positron-molecule binding energies[1] C.M. SURKO, J.R. DANIELSON, University of California, San Diego, J.A. YOUNG, Jet Propulsion Laboratory
— Positron annihilation on many molecular species occurs via vibrational Feshbach resonances thus indicating that positrons bind to these molecules[2]. The downshifts in these resonances from the energies of the molecular vibrational modes provide a measure of the positron-molecule binding energy, ϵ_b. To date, binding energies for thirty molecular species have been measured using this technique[2]. This paper describes a regression analysis of the dependence of ϵ_b on molecular parameters. A reasonably accurate model can be constructed using a weighted, linear combination of the dipole polarizability, permanent dipole moment, and the number of π bonds for the molecule. The resulting expression is used to compare with existing theoretical predictions of ϵ_b. In some cases the predictions are within a factor of two, while in others, they are off by as much as an order of magnitude. Tests of the model to predict molecules that do not bind positrons, interesting molecules for future study, and other possible parameterizations of ϵ_b will also be discussed.

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[2]J. A. Young and C. M. Surko, *Phys. Rev. A* **77**, 052704 and **78**, 032702 (2008).

James Danielson
UCSD

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