

Abstract Submitted
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Resonant positron annihilation in rings and substituted alkanes¹

J.A. YOUNG, C.M. SURKO, University of California, San Diego — Energy-resolved positron-on-molecule annihilation rates have been measured for a variety of molecules by passing a cold positron beam through test gases [1,2]. In many cases, the annihilation rates exceed the free electron annihilation rate by orders of magnitude. In particular, when the positron energy equals a vibrational mode energy minus the binding energy, large vibrational Feshbach resonances (VFR) are observed. In alkane molecules, the height of the C-H stretch resonances grow exponentially and the binding energy grows linearly with the number of carbons [1]. In this paper, we report new results for benzene, d-benzene, and 1-chlorohexane. Specifically, we examine the relationship between binding, C-H peak height, and molecular size. All these molecules have deeper binding than alkanes with similar numbers of carbons or atoms. An empirical trend will be discussed such that molecules with the same number of atoms have similar C-H peak heights when the simple kinematic effects of the binding energy on VFR are normalized out.

[1] L. D. Barnes, *et al.*, *Phys. Rev. A* **67**, 032706 (2003).

[2] L. D. Barnes, *et al.*, *Phys. Rev. A* **74**, 012706 (2006).

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