

Valence Calculations of Lanthanide and Actinide Anion Binding Energies

This document contains graphical representations of our most recent relativistic configuration-interaction calculations of lanthanide and actinide anion binding energies. Our comprehensive survey of the two rows predicts 118 bound anion states for the lanthanides, La ($Z=57$) through Lu ($Z=71$), and 41 states for the actinides, Ac ($Z=89$) through Lr ($Z=103$). No bound anion states are predicted for Yb, Fm, Md, or No. This pdf file is available online (along with a black and white version) at:

www.phy.mtu.edu/~donald/research.html

The anion data is taken from the following references:

- S. M. O'Malley and D. R. Beck, Phys. Rev. A **78**, 012510 (2008).
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- S. M. O'Malley and D. R. Beck, submitted to Phys. Rev. A (actinide work).

The neutral energies and LS designations are from the following:

Atomic Energy Levels The Rare Earth Elements, edited by W. C. Martin, R. Zalubas, and L. Hagan, Natl. Bur. Stand. Ref. Data Ser. Natl. Bur. Stand. (U.S.) Circ. No. 60 (U.S. GPO, Washington, DC, 1978).

Energy Levels and Atomic Spectra of Actinides, edited by J. Blaise and J.-F. Wyart, International Tables of Selected Constants **20**, Paris (1992).

NIST Atomic Spectra Database:

physics.nist.gov/PhysRefData/ASD/

NIST Handbook of Basic Atomic Spectroscopic Data:

physics.nist.gov/PhysRefData/Handbook/

Neutral Lr excited 2D thresholds are from the following computational sources:

- A. Borschevsky, E. Eliav, M. J. Vilkas, Y. Ishikawa, and U. Kaldor, Eur. Phys. J. D **45**, 115 (2007).
- S. Fritzsche, C. Z. Dong, F. Koike, and A. Uvarov, Eur. Phys. J. D **45**, 107 (2007).
- Y. Zou and C. Froese Fischer, Phys. Rev. Lett. **88**, 183001 (2002).
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