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Valence calculations of binding energies of mid-row lanthanides STEVEN M. O'MALLEY, DONALD R. BECK, Physics Department, Michigan Technological University — Binding energies of mid-row lanthanides have been calculated by taking advantage of the >90% LS purity of the $4f^n$ subgroups of their neutral ground states 2 . As described in our recent work on Nd $^{-3}$, the $4f^n$ electrons were treated as core-like and restricted to a single LS term throughout all Dirac-Fock and correlation configurations, resulting in manageable relativistic configuration-interaction calculations for these computationally complex systems. Several weakly bound 6p attachments (<200 meV) were found for each negative ion, and these were carefully analyzed with respect to approximate LS total configuration as well as the j's of the the $4f^n$ subgroup and 6p electron.

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² 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, D.C., 1978).

³S. M. O'Malley and D. R. Beck, Phy. Rev. A 77, 012505 (2008).