

Abstract Submitted
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Low-Energy Electron Elastic Cross Sections for Lanthanide Atoms Z. FELFLI, A.Z. MSEZANE, Clark Atlanta University, D. SOKOLOVSKI, Queen's University of Belfast, UK — Dramatically sharp resonances characterize the near-threshold electron elastic scattering total cross sections for the lanthanide atoms, whose energy positions are identified with the binding energies (BEs) of the negative ions formed during the collisions as Regge resonances. The recently developed Regge-pole methodology which naturally embodies the crucial electron correlation effects together with a Thomas-Fermi type potential incorporating the vital core-polarization interaction are used for the calculations[1]. The extracted BEs of the lanthanide negative ions vary from 0.016 eV for Tm⁻ to 0.631 eV for Pr⁻. All the negative ions of the lanthanides can be classified as weakly bound (BEs < 1.0 eV), while only three are tenuously bound (BEs < 0.1 eV) [2]. Ramsauer-Townsend minima, shape resonances and the Wigner threshold behavior for these lanthanides are also determined. Extracted EAs for La and the open d- and f- subshell Ce atoms agree excellently with the measured data [3, 4] while for Nd and Eu the agreement with calculated values [5] is outstanding. [1] D. Sokolovski et al, Phys. Rev. A 76, 012705 (2007) [2] Z. Felfli et al, Phys. Rev. A 79, At Press (2009) [3] A. M. Covington et al, J. Phys. B 31, L855 (1998) [4] C.W. Walter et al, Phys. Rev. A 76, 052702 (2007) [5] S.M. O'Malley and D.R. Beck, Phys. Rev. A 78, 012510 (2008) Supported by U.S. DOE, Division of Chemical Sciences.

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