

Abstract Submitted
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Low-energy electron elastic collisions with Th, Pu, Am, No and Lr actinide atoms¹ ZINEB FELFLI, KELVIN SUGGS, ALFRED Z MSEZANE, Clark Atlanta Univ — Recently, the experiment [1] measured the electron affinity (EA) of Th for the first time to be 0.608 eV. Following [2] we have used our robust Regge-pole methodology to probe negative-ion formation in the atoms Th, Pu, Am, No and Lr through the electron elastic total cross sections (TCSs) calculations. The TCSs are found to be characterized by ground, metastable and excited anionic formation, requiring careful identification. New manifestations in the TCSs for the Pu, Am, No and Lr atoms have been discovered; namely, atomic and fullerene molecular behavior near threshold [3]. Also, a polarization-induced metastable cross section with a deep Ramsauer-Townsend (R-T) minimum near threshold has been identified in the Am TCSs, which flips over to a shape resonance appearing very close to threshold in the TCSs for No. We have attributed these peculiar tunable behaviors in the TCSs to size effects impacting significantly the polarization interaction. This provides a novel mechanism of tuning a shape resonance and R-T minimum through the polarization interaction via the size effect. Our extracted anionic binding energies from the TCSs are compared with available EAs. 1. R. Tang *et al*, Phys. Rev. Lett. **123**, 203002 (2019) 2. Z. Felffi and A.Z. Msezane, Appl. Phys. Research **11**, 52 (2019) 3. A.Z. Msezane and Z. Felffi, Chem. Phys. **503**, 50 (2018) .

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