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Multiple excited negative ion formation in low energy electron collisions with Tm, Lu and Hf atoms¹ Z. FELFLI, A.Z. MSEZANE, Clark Atlanta University, D. SOKOLOVSKI, Queen's University of Belfast — The interplay between negative ion resonances and Ramsauer-Townsend minima that characterize low energy electron elastic total cross sections (TCSs) has been identified as the fundamental mechanism that drives nanoscale catalysis [1]. Accurate binding energies (BEs) are required for understanding chemical reactions involving negative ions. Thus, there is need to identify and delineate resonance structures and minima in electron TCSs for atoms and molecules in the near threshold energy region. Here we explore, following the recent success [2], low-energy $E \leq 1.0$ eV electron elastic scattering from Tm, Lu and Hf complex atoms, searching for electron attachment manifesting as Regge resonances in the TCSs, using our recent Regge pole method [3]. Sharp resonances characterize these cross sections, corresponding to the multiple negative ion formation. From the energy positions of the resonances we have extracted the BEs of the ground, first and second excited states of the Tm^- , Lu^- and Hf^- . Our BEs for Hf^- are compared with existing data.

[1] A.Z. Msezane *et al*, *J. Phys. B* **43**, 201001 (2010)

[2] Felfli *et al*, *Phys. Rev. A* **81**, 042707 (2010).

[3] D. Sokolovski *et al*, *Phys. Rev. A* **76**, 012705 (2007)

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