

Abstract Submitted
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**Elastic scattering of slow electrons from Mn, Zn and Cd atoms:
First prediction of stable negative ions**¹ Z. FELFLI, A.Z. MSEZANE, Clark
Atlanta University, D. SOKOLOVSKI, Queen's University of Belfast — The appear-
ance of a large peak in low energy electron – atom elastic scattering total cross sec-
tions (TCSs) facilitates considerably the identification of the binding energies (BEs)
of negative ions, formed during the collision as resonances [1]. Both relativistic and
nonrelativistic calculations [2, 3] and coupled cluster and multireference methods[3]
concluded that Mn, Zn and Cd atoms do not bind electrons to form stable negative
ions. Crucial to the existence and stability of most negative ions are the electron
correlations and core-polarization interactions. The recent Regge-pole methodology
[4] wherein these physical effects are embedded is used to explore possible formation
of stable negative ions of Mn, Zn and Cd through slow electron collisions. From the
imaginary parts of the complex angular momenta, we conclude that all these atoms
form stable weakly bound negative ions. Binding energies, shape resonances and
Ramsauer-Townsend minima are presented.

[1] P. D. Burrow *et al*, J. Phys. B **9**, 3225 (1976)

[2] Z. J. Wu *et al*, Chem. Phys. Lett. **423**, 81 (2006)

[3] N. B. Balabanov *et al*, J. Chem. Phys. **123**, 064107 (2005); **125**, 074110 (2006)

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

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