

Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Negative ion formation in fullerene molecules C_{44} , C_{74} , C_{100} and C_{136} : determination of their electron affinities ALFRED Z MSEZANE, ZINEB FELFLI, Clark Atlanta University — In the context of fullerene negative ion catalysis, fullerenes for organic solar-cells, sensor technology, etc. here we investigate the variation of the electron affinity (EA) with the fullerene size from C_{44} to C_{136} and contrast their EAs with that of C_{60} . In fullerene molecule negative ion formation, it has been demonstrated for the first time that the ground state anionic binding energies (BEs) extracted from our Regge-pole calculated electron elastic scattering total cross sections (TCSs) for the C_{20} through C_{92} fullerenes matched excellently the measured EAs of these fullerenes [1, 2]. The Regge-pole methodology requires no assistance whatsoever from either experiment or other theory for the remarkable feat. This provides a novel approach to the determination of reliable EAs for complex heavy systems. Here we have used the robust Regge-pole methodology to investigate negative ion formation in the fullerenes C_{44} , C_{74} , C_{100} and C_{136} through the low-energy electron elastic TCSs calculations. The TCSs are found to be characterized generally by Ramsauer-Townsend minima, shape resonances and dramatically sharp resonances manifesting ground and metastable anionic formation during the collisions. The extracted ground state anionic binding energies (BEs) from the TCSs for C_{44} , C_{74} , C_{100} and C_{136} are 3.25eV, 4.03eV, 3.67eV, 3.75eV, respectively. These correspond to the EAs of the fullerene molecules and demonstrate the wide variation from fullerene to fullerene. The BEs will be contrasted with those of the standard C_{60} and other fullerenes as well. 1. A. Z. Msezane and Z. Felfli, Chem. Phys. **503**, 50 (2018); 2. Z. Felfli and A. Z. Msezane, Euro Phys. J. D **72**, 78 (2018)

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Date submitted: 31 Jan 2019

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