Photo-multidetachment and Fragmentation of $C_{60}^{-1}$

R.C. BILODEAU, M. HOENER, N. BERRAH, Western Michigan U., Kalamazoo MI, S. SCHIPPERES, A. MULLER, Justus-Liebig-Universitat, Giessen, D.A. ESTEVES, R. PHANEUF, U. of Nevada, Reno NV, N.D. GIBSON, C.W. WALTER, Denison U., Granville OH, A. AGUILAR, LBNL-ALS, Berkeley CA, J.M. ROST, Max-Planck-Institut, Dresden — Absolute single-photon multi-detachment and fragmentation cross sections of $C_{60}^{-}$ fullerene anions have been measured as a function of energy with the merged ion-photon beam apparatus at the ALS. Multiple electron ejection was substantial at all photon energies, allowing product charge states up to $C_{60}^{3+}$ to be measured. We argue that $q$-fold detachment spectra of $C_{60}^{-}$ relate directly to $q$-fold ionization of neutral $C_{60}$, except the loosely bound excess electron of $C_{60}^{-}$ results in a significant change of the energy scale and increase of the absolute cross section, with otherwise little change in the structure. Fragmentation into cations of $C_{58}$ and $C_{56}$ was also studied. We conclude from the determination of appearance thresholds that fragmentation occurs at significantly lower photoexcitation energies in $C_{60}^{-}$ than in $C_{60}$.

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