Electronic Supplementary Information for

Localized Surface Plasmon Resonances of Size-Selected Large Silver Nanoclusters (n = 70~100) Soft-Landed on a C_{60} Organic Substrate

Tomoya Inoue,[a] Kaito Mizoguchi,[a] Miwa Tokita,[a] Masahiro Shibuta,[b,§] Masato Nakaya,[a,†] Toyoaki Eguchi, [a,‡] and Atsushi Nakajima[a,b,*]

[a]*Department of Chemistry, Faculty of Science and Technology, Keio University, 3-14-1 Hiyoshi, Kohoku-ku, Yokohama 223-8522, Japan*

[b]*Keio Institute of Pure and Applied Sciences (KiPAS), Keio University, 3-14-1 Hiyoshi, Kohoku-ku, Yokohama 223-8522, Japan*

*Address correspondence to A. Nakajima

Tel: +81-45-566-1712, Fax: +81-45-566-1697, E-mail: nakajima@chem.keio.ac.jp

§Present address: *Department of Physics and Electronics, Graduate School of Engineering, Osaka Metropolitan University, 1-1 Gakuen-cyo, Naka-ku, Sakai, Osaka 599-8531 Japan*

†Present address: *Department of Energy Science and Engineering, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan*

‡Present address: *The Toyama Monozukuri Center, 3816-1 Kishi, Yamakita-machi, Ashigarakami-gun, Kanagawa, 258-0112, JAPAN*

Contents

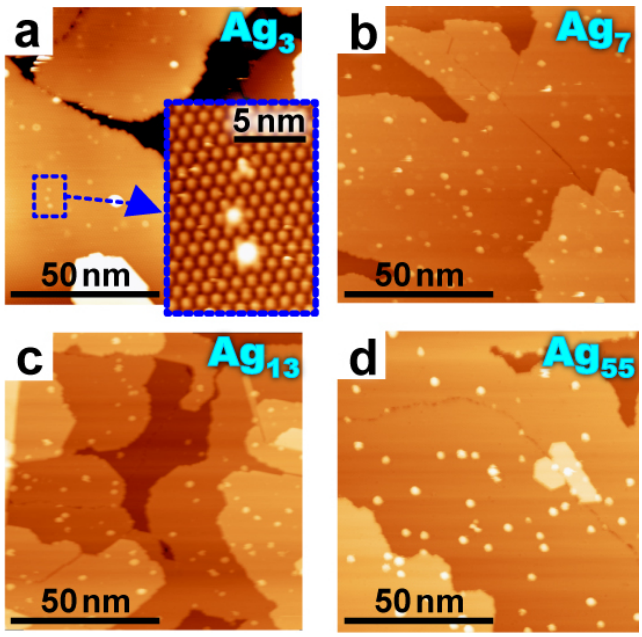

Figure S1. STM image of soft-landed Ag_n NCs on a C_{60} substrate (100 × 100 nm^2) at a low coverage (~4 × 10^3 dots/μm^2 ≈ 7.3 ×10^{-3} ML); (a) n=3, (b) n=7, (c) n=13, and (d) n=55. The tip bias voltage (V_t) and tunneling current (I_t) are V_t = -2.0 V and I_t = 10 pA, respectively. Inset in (a) is a high-resolution image of a rectangular region surrounded by dotted line in (a). Bright dots correspond to individual Ag_n NCs, monodispersively immobilized on the C_{60} surface,[1] similar to Ag_{75} NCs on C_{60} in Figure 1 in the main text.

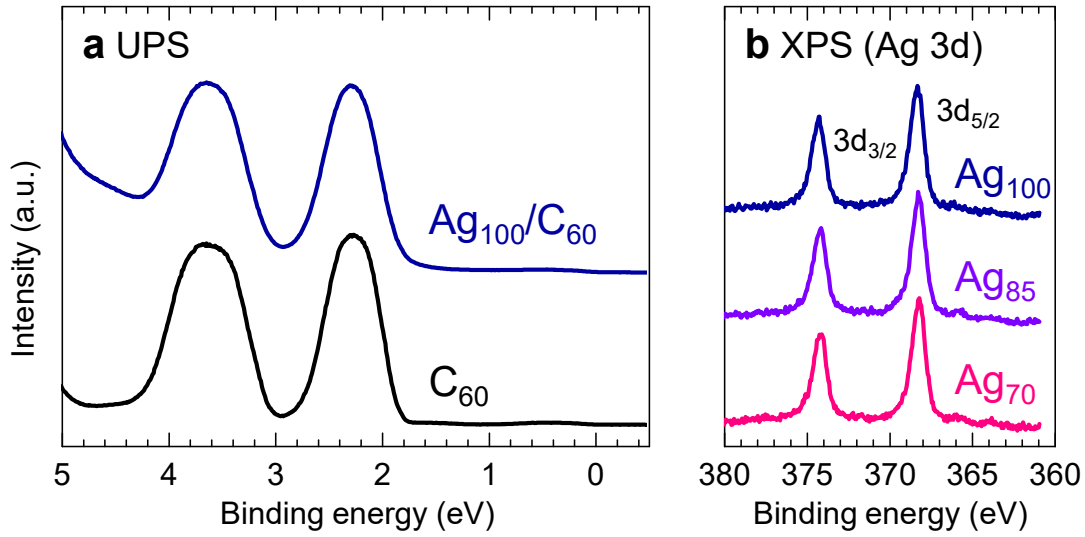

Figure S2. (a) Ultraviolet photoelectron spectrum for Ag_{100} nanoclusters (NCs) on a C_{60} substrate and (b) X-ray photoelectron spectra for Ag 3d of Ag_{70}, Ag_{85}, and Ag_{100} NCs. In the UPS spectra, peaks assignable to the highest occupied molecular orbital (HOMO) and the second HOMO (HOMO-1) are observed at the binding energies (BEs) of 2.3 and 3.6 eV, respectively, which show no peak shift with the deposition of Ag_{100} nanoclusters (NCs). Since they shift toward higher BEs with electron donation or toward lower BEs with electron acceptance,[2] the lack of shift indicates that Ag_{100} NCs on C_{60} are in a neural state. In the XPS spectra for Ag 3d, although characterizing their charge states is hard due to intrinsic small chemical state dependence within the spectral resolutions, it does not seems contradictory to the zerovalent of Ag atoms in Ag_n NCs, and no NC size-dependent behavior is observed.

Reference

1. M. Nakaya, T. Iwasa, H. Tsunoyama, T. Eguchi, and A. Nakajima, *Adv. Funct. Mater.*, **2014**, *24*, 1202–1210 (2014).
2. T. Kamoshida, M. Shibuta, T. Ohta, T. Eguchi, and A. Nakajima, *J. Phys. Chem. C*, **2022**, *126*, 10889–10899.