Electronic Supplementary Information

## Facile Organic Surfactant Removal of Various Dimensional Nanomaterials Using Low-Temperature Photochemical Treatment

Chahwan Hwang<sup>a†</sup>, Jae Sang Heo<sup>b†</sup>, Kyung-Tae Kim<sup>b</sup>, Yeokeyung Kang<sup>a</sup>, Byungdoo

Choi<sup>a</sup>, Yong-Hoon Kim<sup>c</sup>, Antonio Facchetti<sup>d,e</sup>, Sung Kyu Park<sup>b\*</sup>, and Myung-Gil Kim<sup>a\*</sup>

<sup>a</sup>Department of Chemistry, Chung-Ang University, Seoul 06980, Korea

<sup>b</sup>School of Electrical and Electronics Engineering, Chung-Ang University, Seoul 06980, Korea

<sup>c</sup>SKKU Advanced Institute of Nanotechnology (SAINT) and School of Advanced Materials Science and Engineering, Sungkyunkwan University, Suwon 16419, Korea

<sup>*d*</sup>Department of Chemistry and the Materials Research Center, Northwestern University, 2145 Sheridan Road, Evanston, Illinois 60208, United States

<sup>e</sup>Flexterra Corporation, 8025 Lamon Avenue, Skokie, Illinois 60077, United States

E-mail: skpark@cau.ac.kr (S. K. Park), myunggil@cau.ac.kr (M.-G. Kim)



Figure S1. Sheet Resistance of thermal treated (a) AgNWs, and (b) Bi<sub>2</sub>Se<sub>3</sub>NSs



**Figure S2**. FESEM image of thermally treated AgNPs with oleylamine capping ligand (OAm-AgNPs) at 150°C. Inner circle shows residual organic surfactants.



**Figure S3.** FESEM images of aggregation phenomenon of OAm-AgNPs at 200°C (a: center, b: edge). The aggregation phenomenon shifted toward the side edge of the substrate.



**Figure S4.** FSEM images of photochemically treated OAm-AgNPs for various DUV exposure times (a: DUV-30 min, b: DUV-60 min, c: DUV-90 min, d: DUV-120 min).



Figure S5. FESEM image of thermally treated AgNP with PVP capping ligand at 120°C.



**Figure S6.** X-ray photoelectron spectroscopy analysis of (a) pristine-PVP-AgNPs, (b) DUV-treated PVP-AgNPs, (c) pristine-OAm-AgNPs, and (d) DUV-treated OAm-AgNPs.



**Figure S7.** X-ray photoelectron spectroscopy analysis of (a) pristine-PVP-AgNWs, (b) DUV-treated PVP-AgNWs, (c) pristine-PVP-Bi<sub>2</sub>Se<sub>3</sub> NSs, and (d) DUV-treated PVP-Bi<sub>2</sub>Se<sub>3</sub> NSs.