Electronic Supplementary Material (ESI) for Nanoscale.

Electronic Supplementary Information

Ultrathin Silver Telluride Nanowire Films and Gold Nanosheet Electrodes for Flexible Resistive Switching Device

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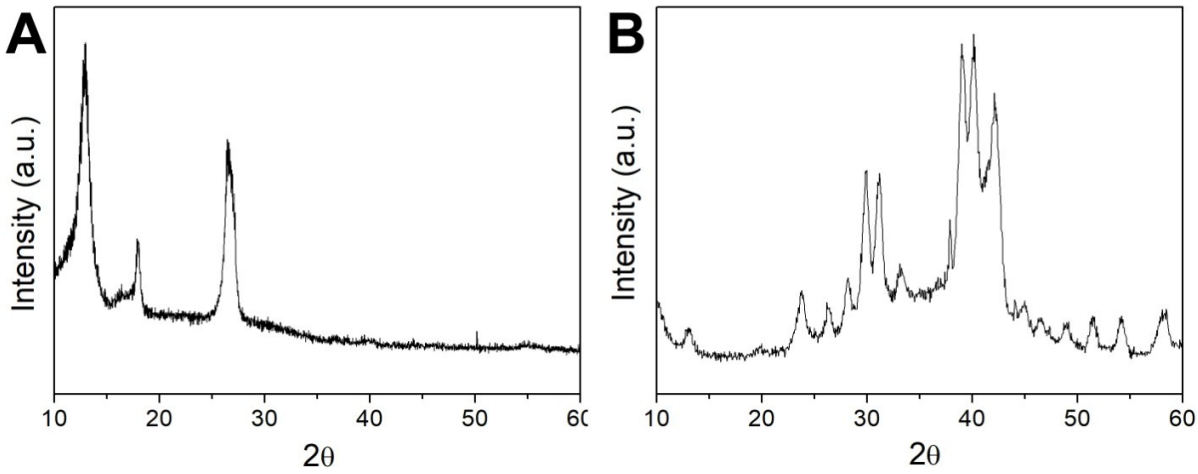

Figure S1. XRD spectra of TeNW (A) and Ag_2TeNW (B), respectively.

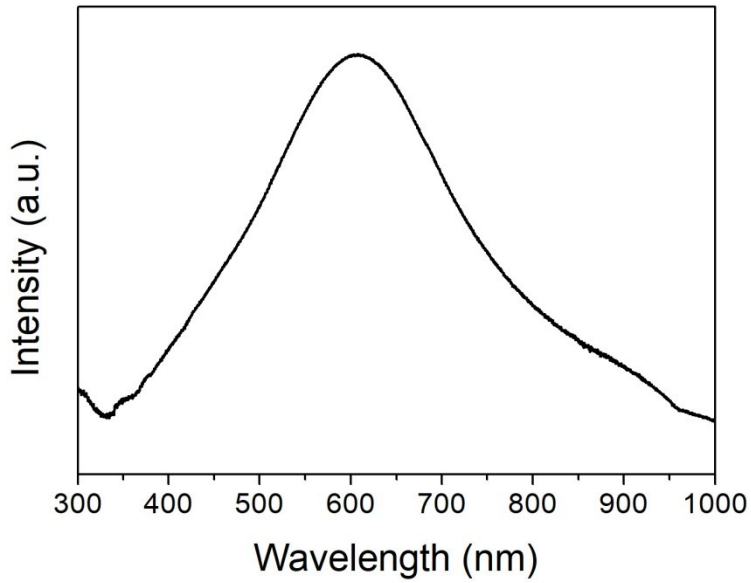

Figure S2. UV-vis spectrum of Te nanowires suspended in DI water.

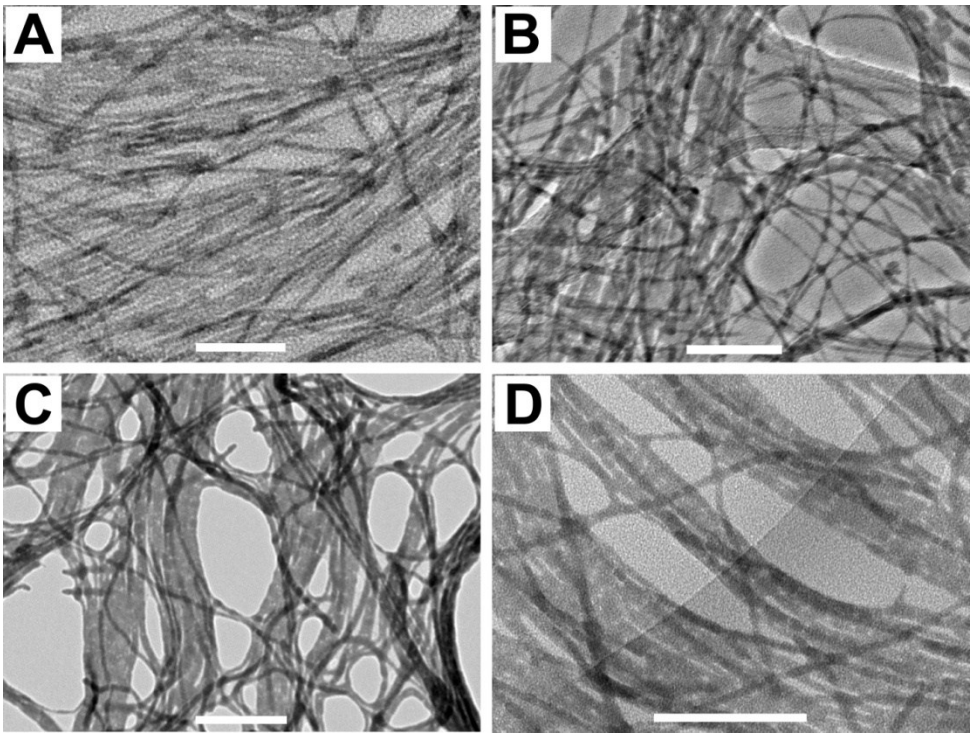

Figure S3. TEM images of silver telluride (Ag_xTe, $0<x\leq2$) nanowires through chemical transformation. The surface morphologies of the nanowires are different according to the magnitude of Ag composition. The scales are 100 nm.

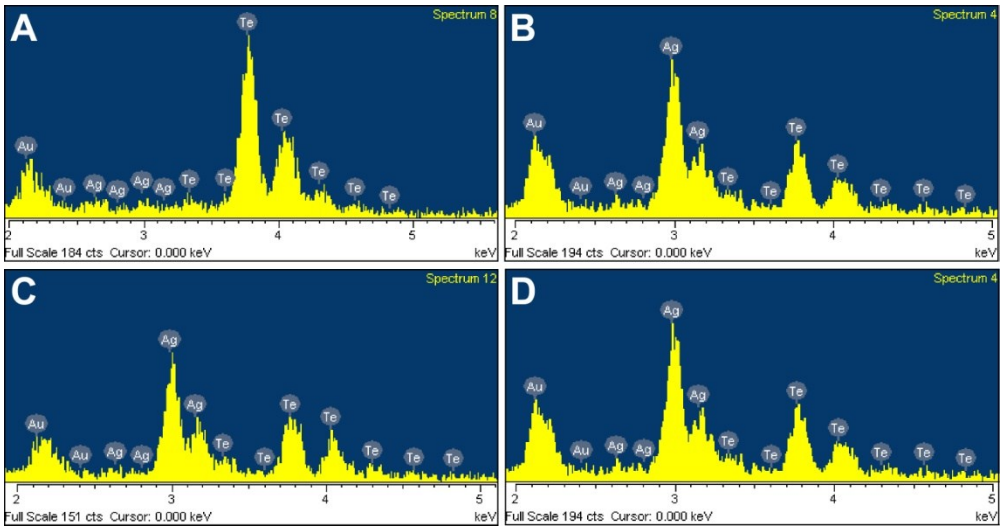

Figure S4. EDS analyses of silver telluride nanowires converted from TeNW film through chemical transformation. The stoichiometries of the samples are $Ag_{0.08\pm0.06}Te$ (A), $Ag_{0.24\pm0.12}Te$ (B), $Ag_{1.67\pm0.16}Te$ (C), and $Ag_{1.99\pm0.17}Te$ (D) corresponding to the TEM imgages in Fig. S1, respectively.

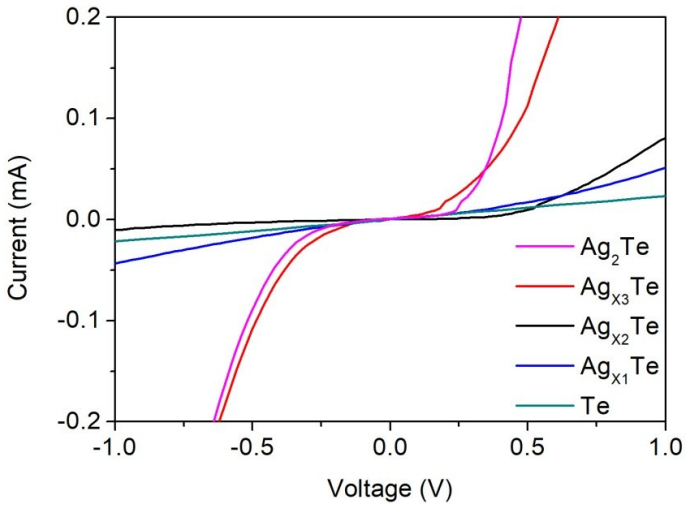

Figure S5. Current-voltage characteristics of monolayer films for Te and silver telluride according to the magnitude of Ag composition. The silver telluride NW film starts to lose the ohmic property with increasing Ag composition. (X_1 = 0.08±0.06, X_2 = 0.24±0.12, X_3 = 1.67±0.16)

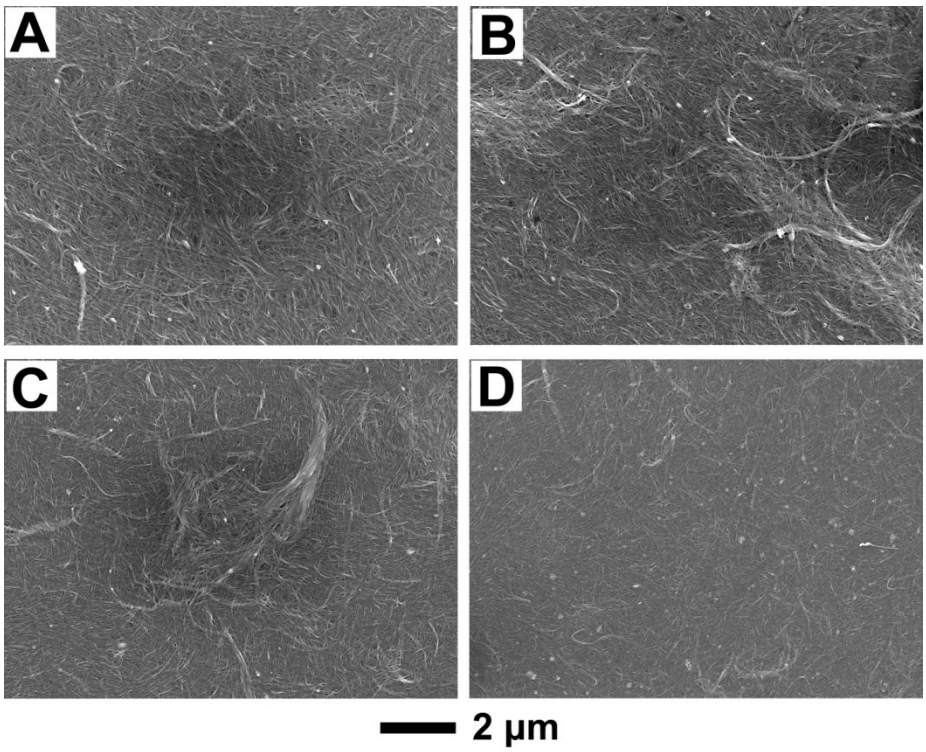

Figure S6. SEM images of silver telluride NW films after adding Ag^+ ([$AgNO_3$] = 0, 0.03, 0.3, and 3 mM) and reduction in hydrazine solution, starting from Ag_2Te NW film. (A) $Ag_{1.99\pm0.17}Te$, (B) $Ag_{2.03\pm0.19}Te$, (C) $Ag_{2.06\pm0.21}Te$, and (D) $Ag_{2.21\pm0.49}Te$, respectively.

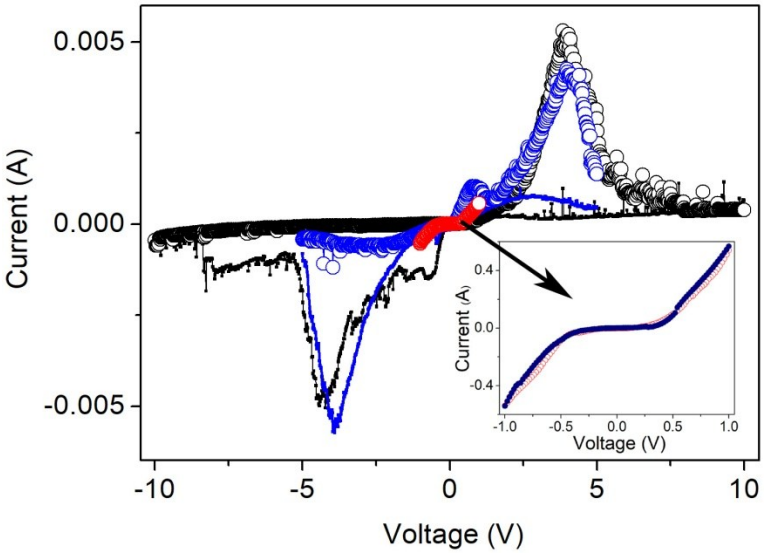

Figure S7. I-V characteristics of monolayer Ag_2TeNW film on Au electrodes with 10-μm gap. Voltage was swept from the positive values (1V, 5V, 10V) to the negative values (−1V, −5V, −10V, symbolized by solid lines) and then from the negative values to the positive values (symbolized by open circles). The inset curves show the enlarged I-V plots swept between −1V and 1V.

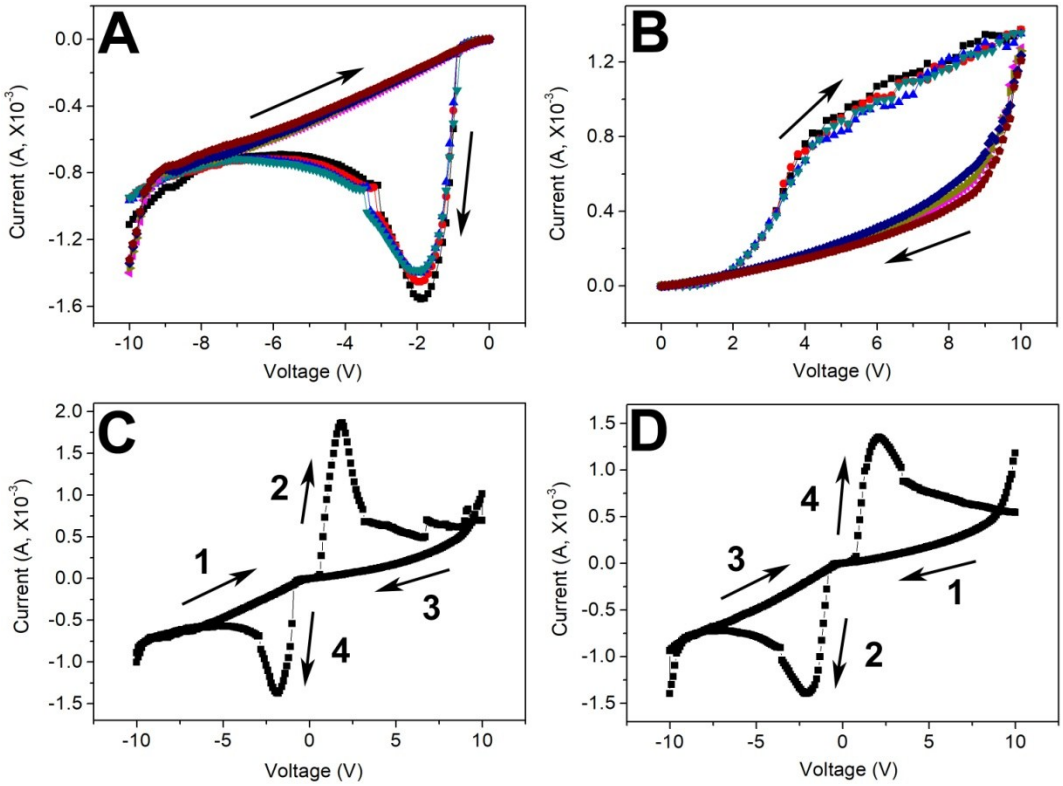

Figure S8. Current-voltage characteristics of five layered Ag_2TeNW film on gold electrodes. (A) I-V curves by sweeping from 0V to −10V and then from −10V to 0V. (B) I-V curves by sweeping from 0V to 10V and then from 10V to 0V. (C) I-V curve by sweeping from −10V to 10V and vice versa. (D) I-V curve by sweeping from 10V to -10V and vice versa.

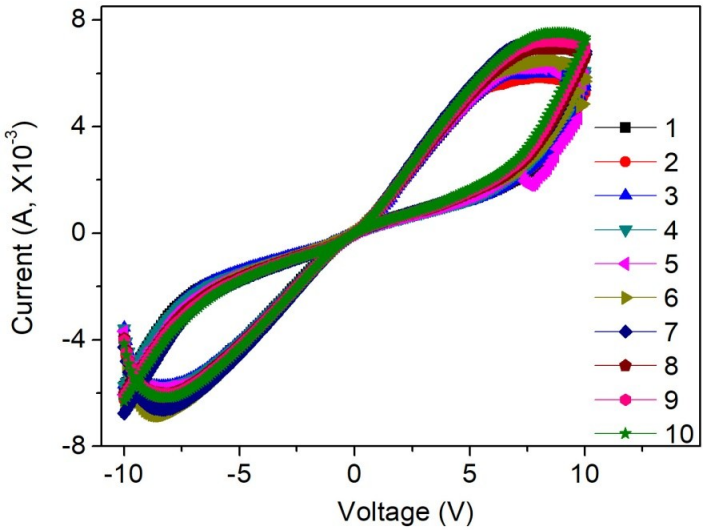

Figure S9. Ten consecutive loops of current-voltage curves of ten layers of Ag_2TeNW film device.

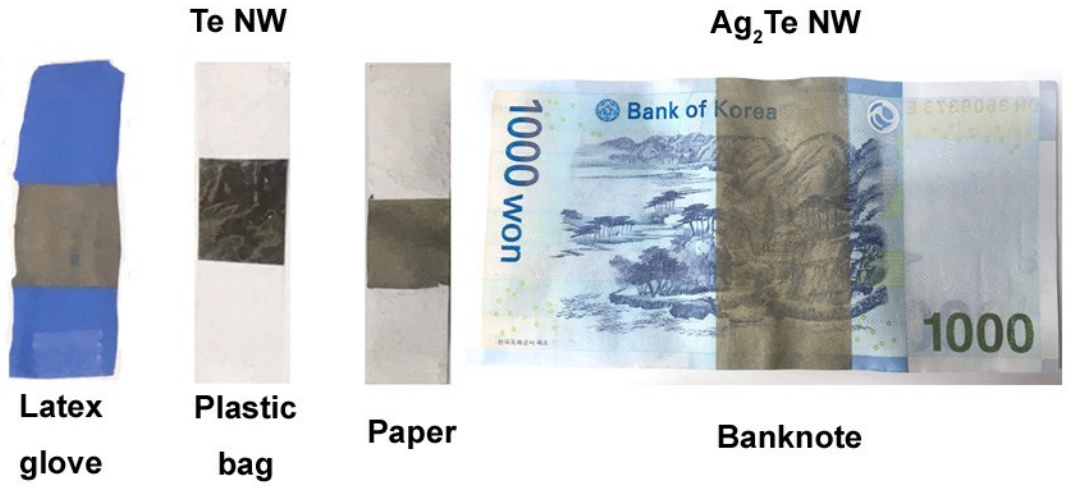

Figure S10. The transferred TeNW and Ag_2TeNW films on various substrates.