Supporting information for

An organic- inorganic three-component nanojunction array: design, construction and its reversible diode-like resistive electrical switching behavior

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1. Chemicals.

$TCNQF_4$ (7, 7, 8, 8-tetracyano-2, 3, 5, 6-tetrafluoroquinodimethane) was purchased from Sigma Company. Acetonitrile (for HPLC, ≥99.9%) was obtained from Aladdin Company. Tetrabutyl orthotitanate (≥98%) was come from Tianjin Fine Chemical research institution. Absolute ethyl alcohol (99.7%), hydrochloric acid (36~38%), silver nitrate (99.5%), and trisodium citrate (98%) were obtained from Beijing Chemical Plant. fluorine-doped tin oxide (FTO) coated glass slides (surface resistance <10 ohm/sq and transmittance ≥77%) were from Zhuhai Kaivo Optoelectronic Technology Co., Ltd. The ultrapure water is purified by a MilliPore system (≥18 MΩ).

2. Semiconductor Characterization System for Electrical property.

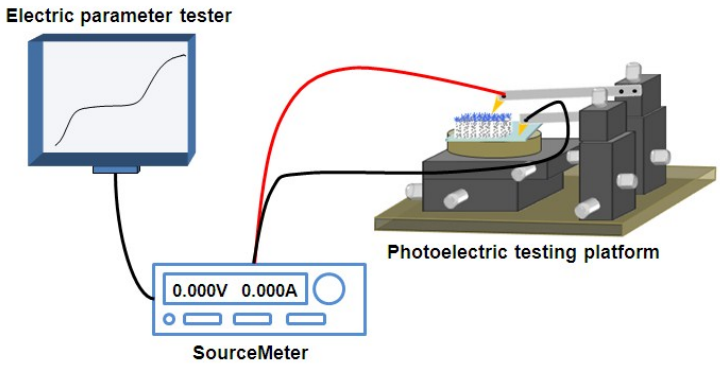
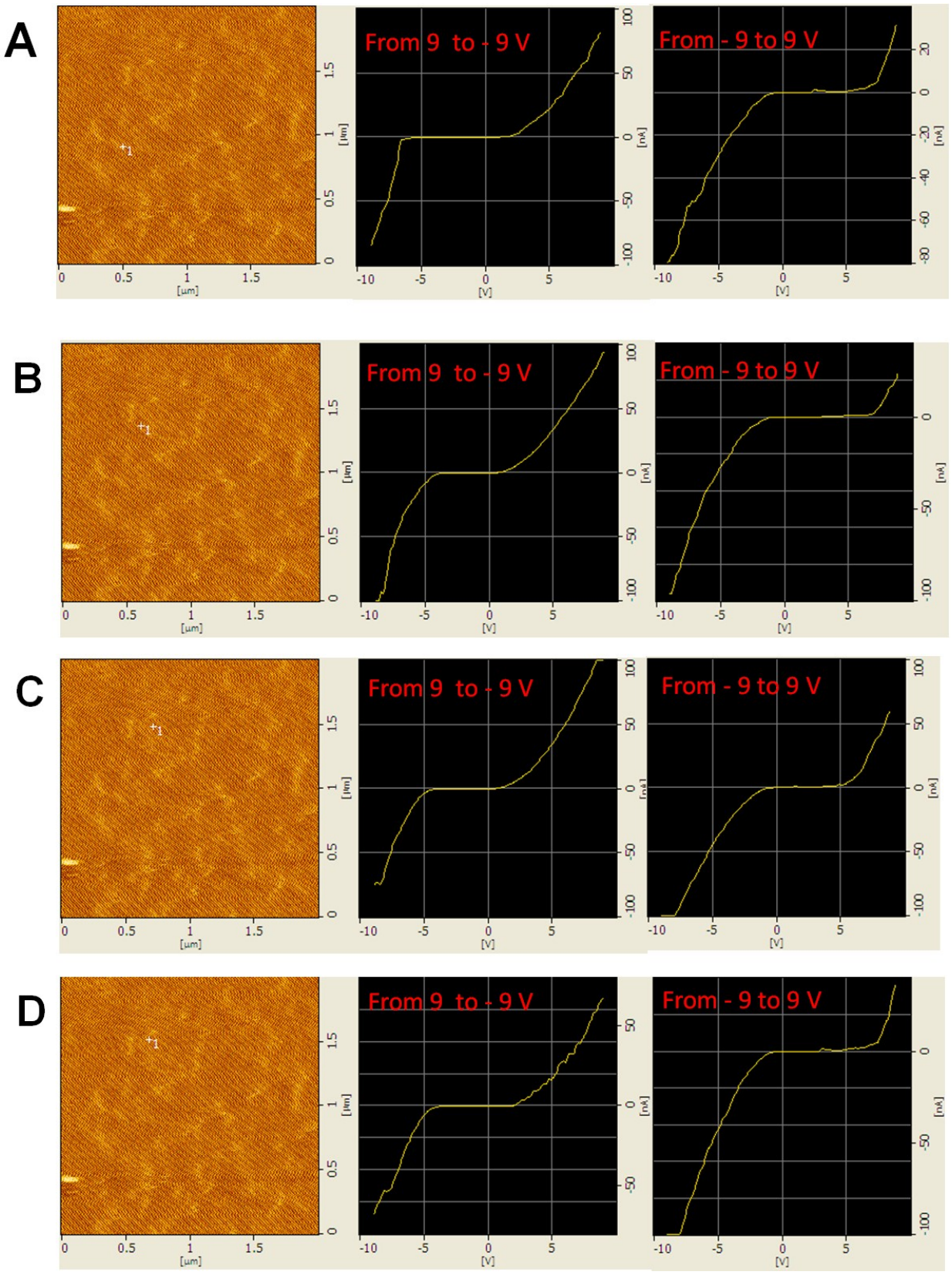


Figure S1. The self-made semiconductor characterization system.

3. Contact Resistance at Different Locations of $AgTCNQF_4$-AgNPs-TiO_2 by Using C-AFM.



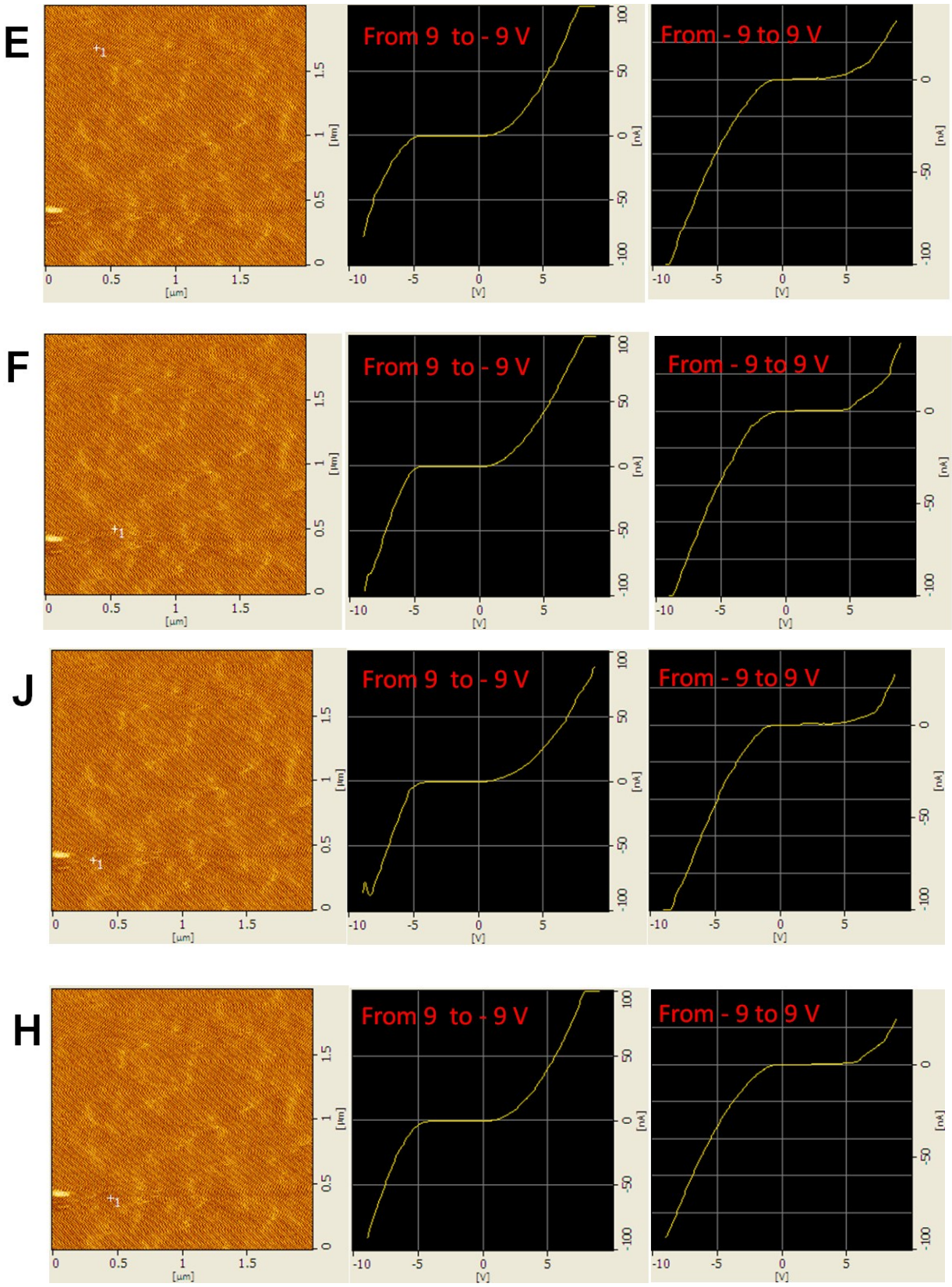


Figure S2. The current mapping (A, B, C, D, E, F, J and H), and corresponds to current-voltage (I-V) curves of $AgTCNQF_4$-AgNPs-TiO_2 three component nanojunction at different locations (the sign of

"+1" marked in the current mapping A, B, C, D, E, F, J and H) of a nanobranch by a C-AFM. The scanning voltage ranges from 9 to - 9 V and from – 9 to 9 V, respectively.

3. Synthesis of $AgTCNQF_4$ on Ag Film and FTO slide.

Silver-tetrafluorotetracyano-p-quinodimethane ($AgTCNQF_4$) microrods were synthesized *via* a solution process.[S4] A 200 nm-thickness Ag film was achieved by the vacuum thermal evaporation deposition on the substance of clean glass slides or FTO glass slides, respectively. Subsequently, these Ag film decorated slides were immersed into a 2.0 mM $TCNQF_4$ acetonitrile solution for 1.0 min. $AgTCNQF_4$ microrods formed above the slides. These slides were then taken out of the above solution and washed by anhydrous acetonitrile to remove the residue.

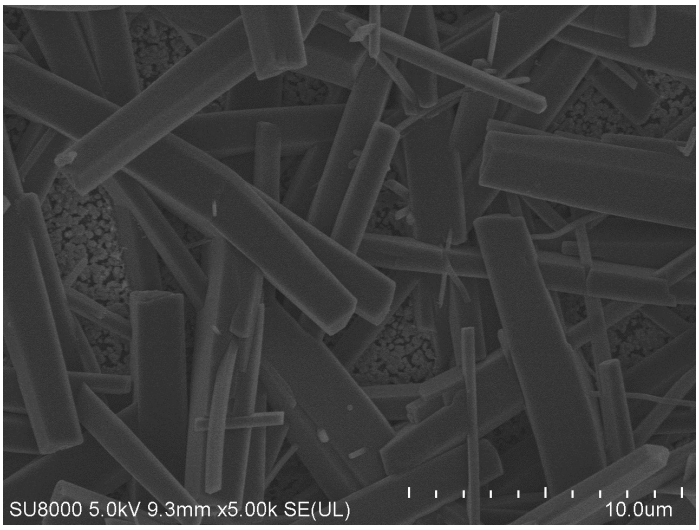


Figure S3. SEM image of the $AgTCNQF_4$ microrods.

References:

[S1] B. Liu, E. S. Aydil, *J. Am. Chem. Soc*, 2009, **131**, 3985.

[S2] X. J. Feng, K. Shankar, O. K. Varghese, M. Paulose, T. J. Latempa, C. A. Grimes, *Nano Lett*, 2008, **8**, 3781.

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[S4] B. Mukherjee, M. Mukherjee, J. Park, S. Pyo, *J. Phys. Chem. C*, 2010, **114**, 567.