Electronic Supplementary Material (ESI) for Soft Matter.

Electronic Supplementary Information (ESI): Growth of Au and ZnS nanostructures via engineered peptide and M13 bacteriophage templates

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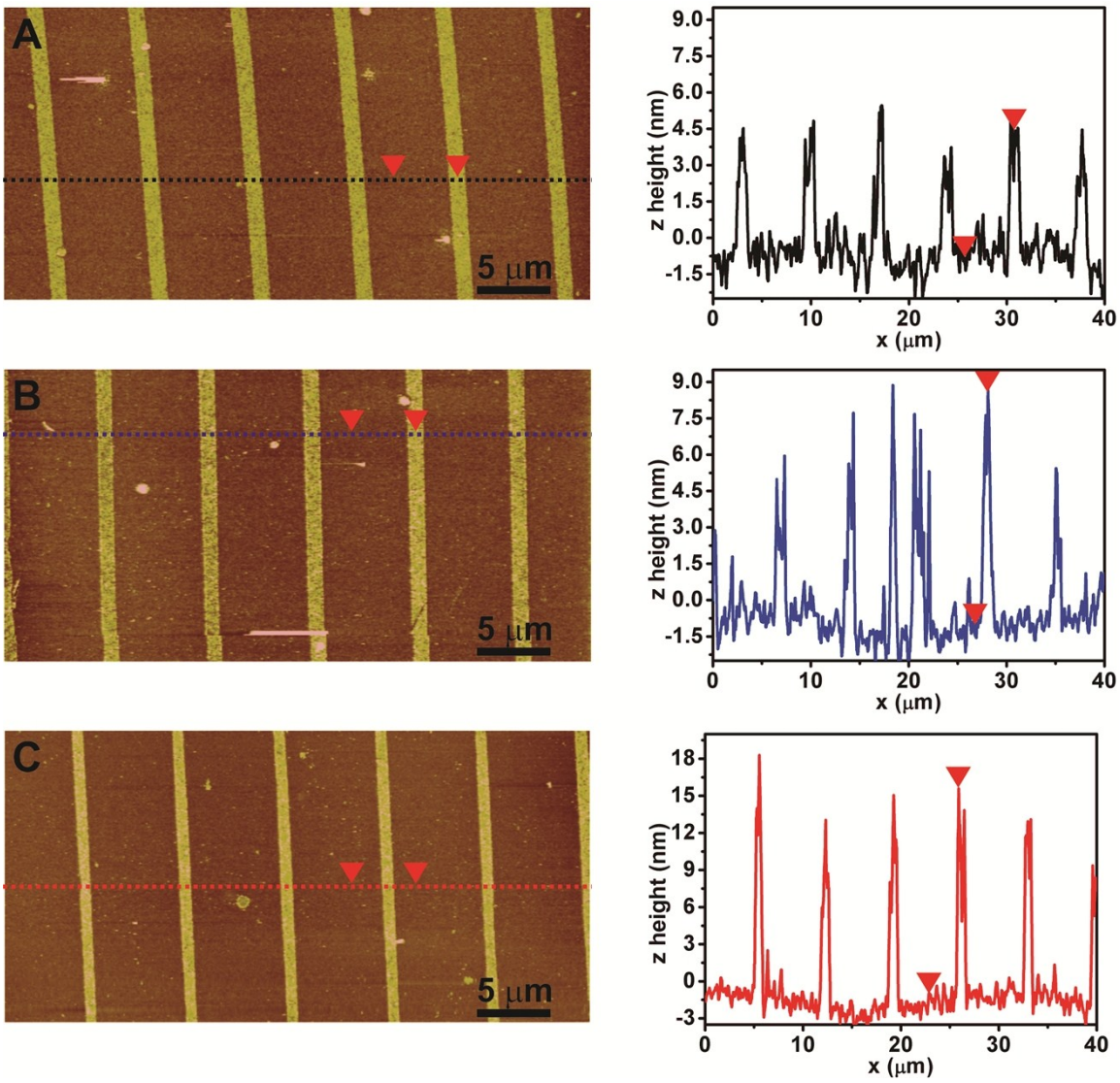

Figure S1. AFM height images and the corresponding z height profiles of Au nanoparticles formed on GBP stripes showing the dependence of the height upon the amount of Ag^+ ions in the growth solution. (A) AFM height image of Au nanoparticles showing average height of ~ 5 nm with the amount of Ag^+ ions was ~ 1 wt. %. (B) AFM height image of Au nanoparticles showing average height of ~ 8 nm with the amount of Ag^+ ions was ~ 10 wt. %. (C) AFM height image of Au nanoparticles showing average height of ~ 20 nm with the amount of Ag^+ ions was ~ 30 wt. %.

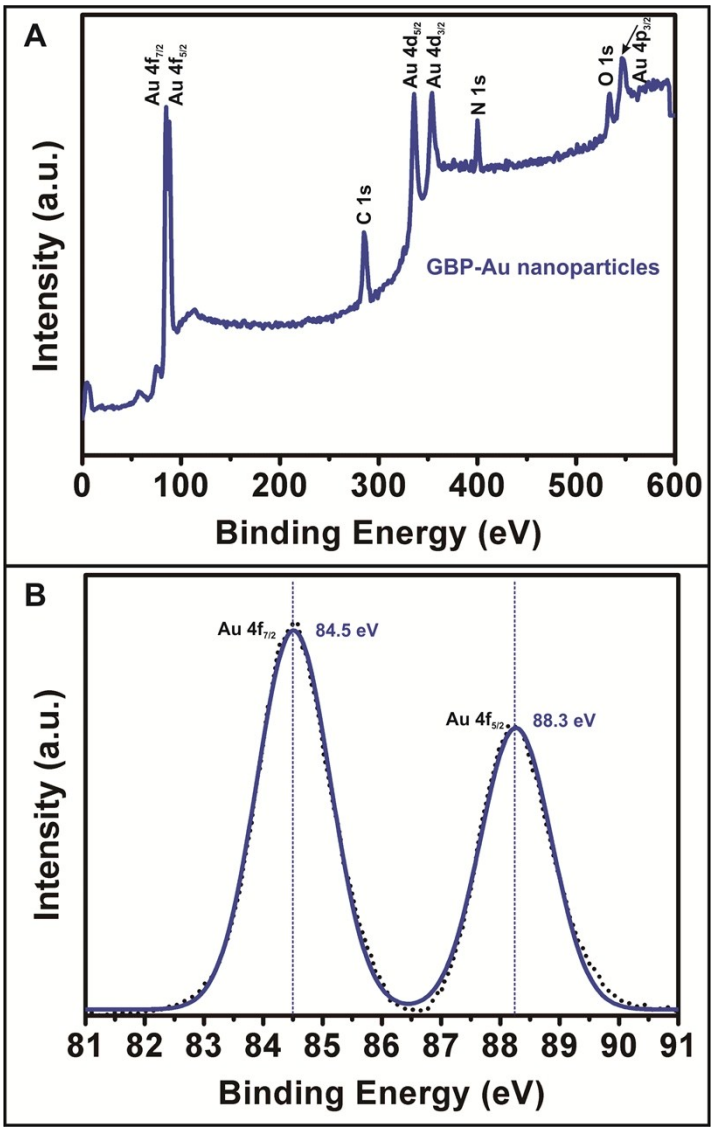

Figure S2. XPS spectrum of Au nanoparticles formed on GBP patterns. (A) Survey XPS spectra of Au nanoparticles in a full range confirms the existence of C, O, N, and Au elements. (B) High resolution XPS spectra of Au nanoparticles (dotted black line) and the corresponding fitted curve (solid blue line) showing 2 main doublets due to the presence of metallic Au with the binding energies (BEs) of Au $4f_{7/2}$ peak at 84.5 eV and Au $4f_{5/2}$ at 88.3 eV. Although slightly shifted by ~ 0.5 eV, these BEs suggest that Au nanoparticles formed on GBP patterns are primarily metallic due to the absence of the BEs that correspond to an ionic state.[1]

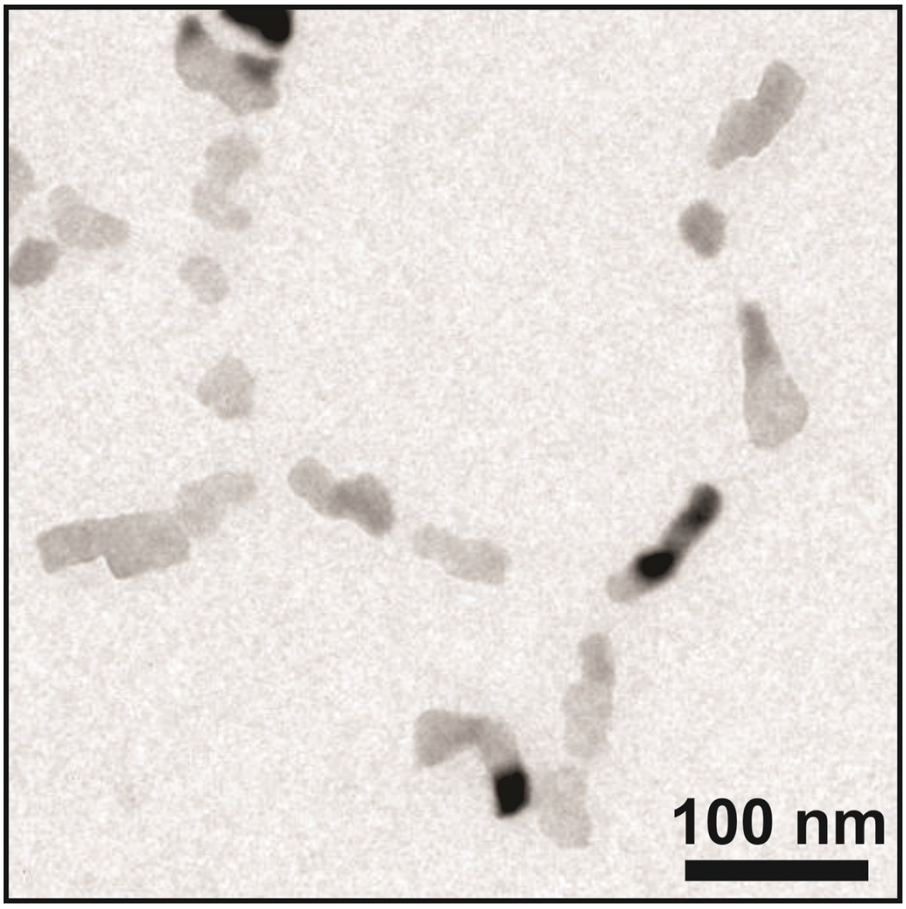

Figure S3. TEM image of Au nanoparticles formed on GBP patterns.

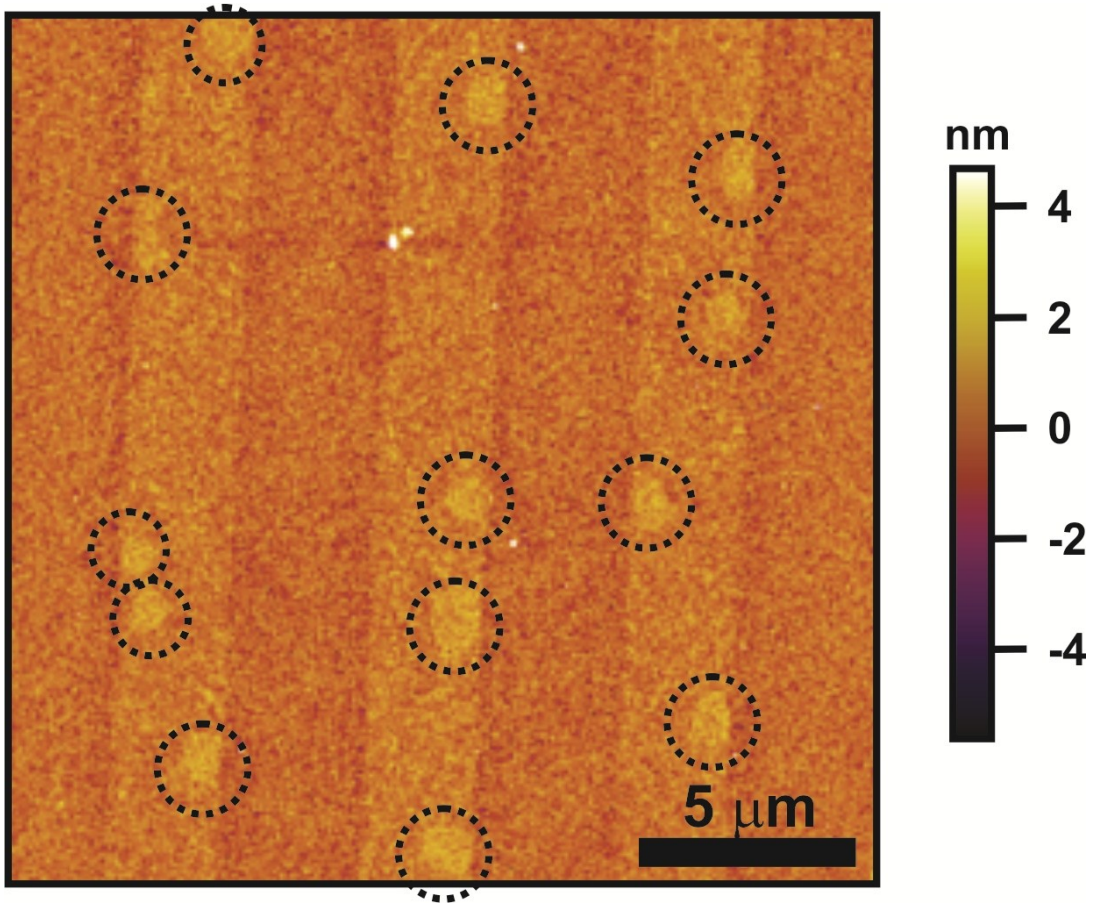

Figure S4. AFM height image of ZnS nanostructures formed on *N*-terminus-$(EEEE)_2$-GGG-C-*C*-terminus ZBP patterns. Black dotted circles indicate the location of ZnS nanostructures formed on the ZBP patterns with the coverage of ~20%, which is comparable to that of *N*-terminus-EEEE-GGG-C-*C*-terminus ZBP patterns (image not shown).

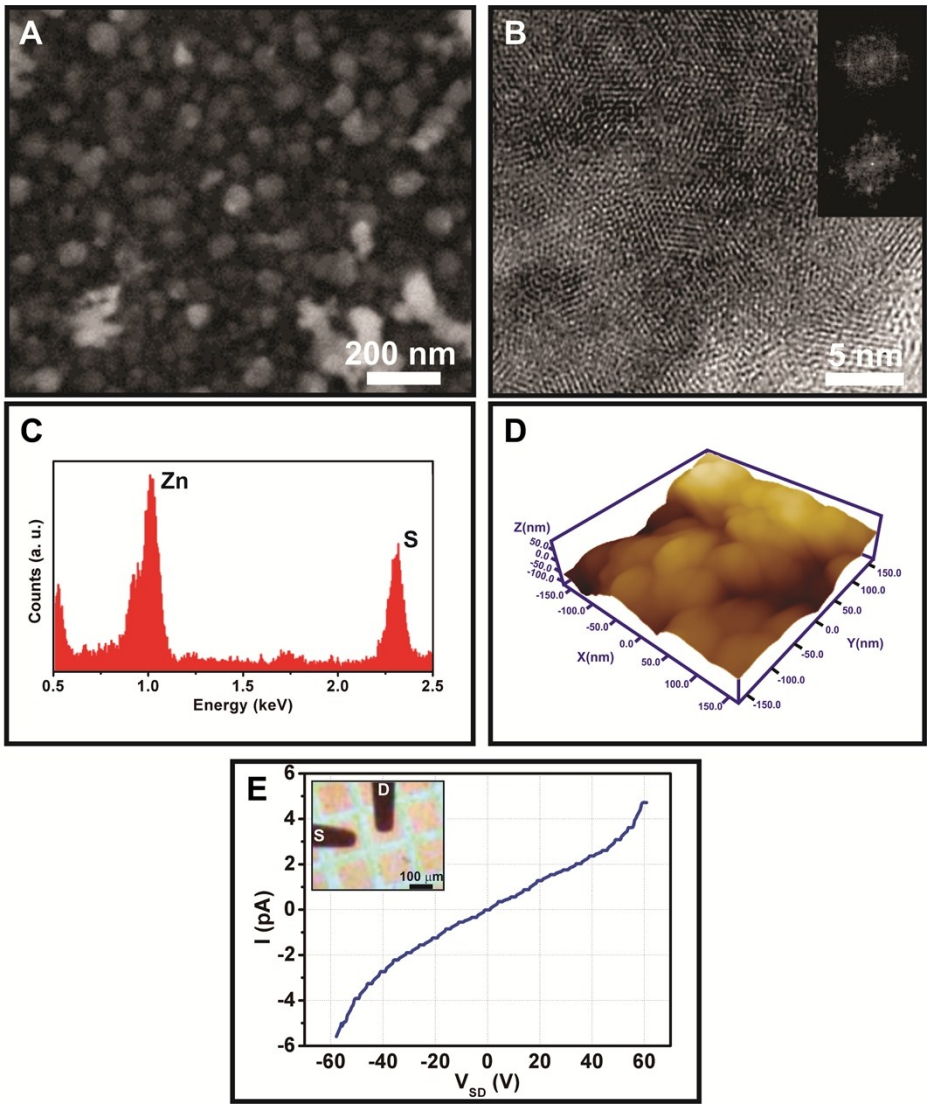

Figure S5. (A) FESEM image of ZnS nanostructures formed on ZBP patterns. (B) TEM image of ZnS nanostructures formed on ZBP patterns and inset SAED images showed the coexistence of zinc blende (top, cubic symmetry) and wurtzite (bottom, hexagonal symmetry) phase of ZnS. (C) EDS of ZnS nanostructures formed on ZBP patterns confirming the existence of Zn and S. (D) AFM height image of ZnS nanostructures formed on ZBP patterns. (E) Current-voltage ($I\text{-}V_{SD}$) characteristics of ZnS nanostructures formed on ZBP patterns.

References

1. M. Matmore and N. Ashkenasy, *J. Mater. Chem.*, 2011, **21**, 968-974.