Supporting Information

In-situ growth of Silver Bismuth Sulfide Nanorod Arrays and Application to Solar Cells

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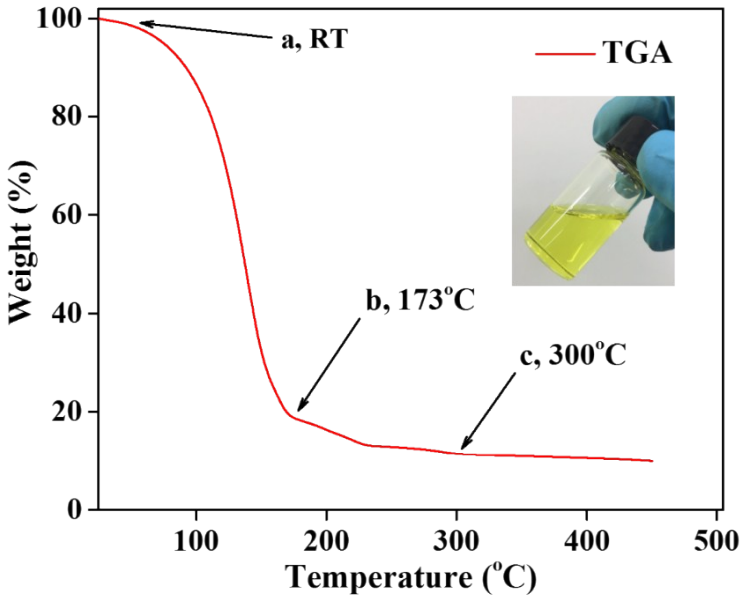


Fig. S1 TGA curve obtained by in situ drying of the $AgBiS_2$ precursor solution. The concentration of $AgBiS_2$ precusor is 0.4M. From a to b, the weight was about 80% which equalled to the evaporation of solvent DMSO. The $AgBiS_2$ precursor decomposition and the thiourea evaporation/decomposition lead to the weight loss from b to c, about 10% remained at the flat range. Inset: a picture of $AgBiS_2$ precursor solution.

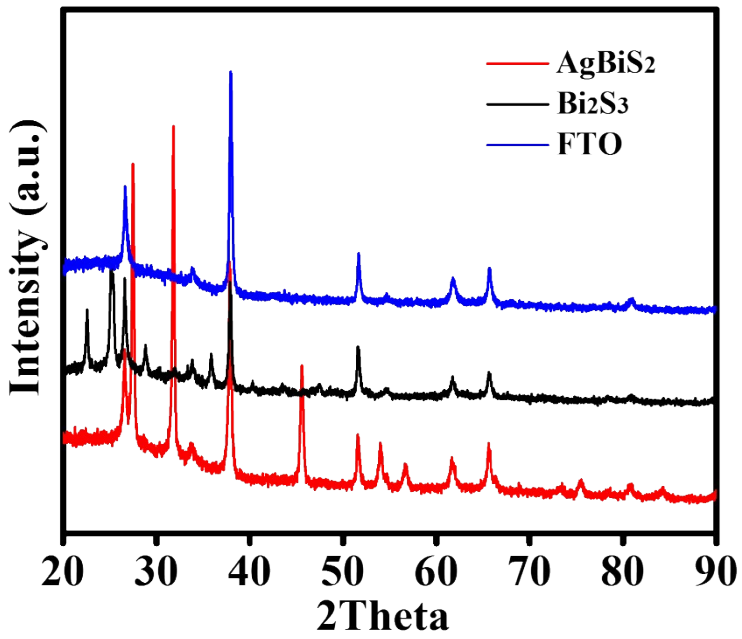


Fig. S2 XRD of $AgBiS_2$, Bi_2S_3 and FTO.

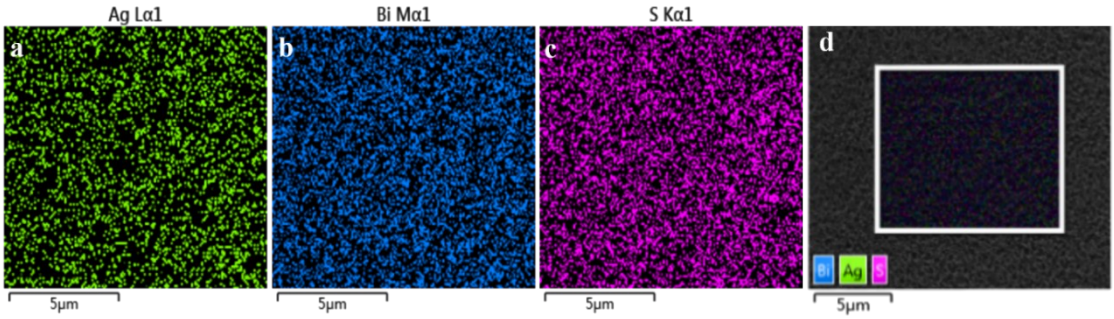
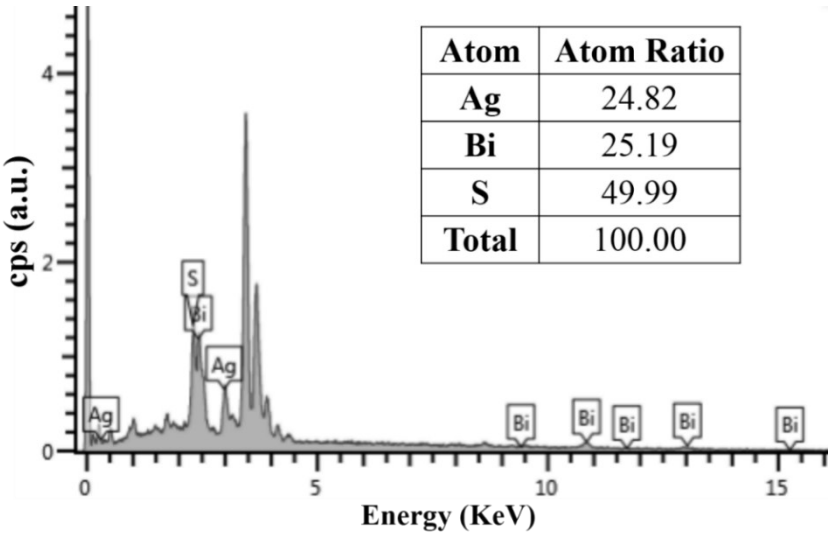


Fig. S3 EDX elemental mapping images of a) Ag, b) Bi, c) S corresponding to the white line square area in (d).



Atom	Atom Ratio
Ag	24.82
Bi	25.19
S	49.99
Total	100.00

Fig. S4 EDX spectrum of the $AgBiS_2$ nanorod-array film.

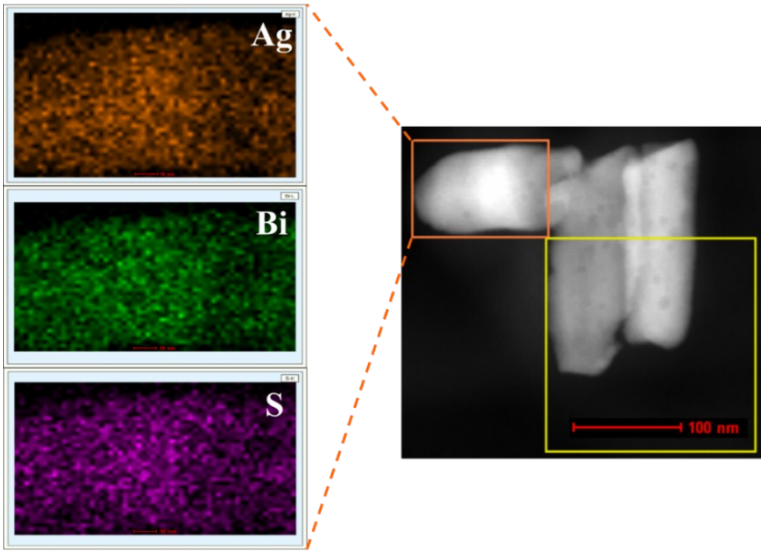


Fig. S5 TEM-EDX distribution mapping for Ag, Bi, and S in an $AgBiS_2$ single nanorod.

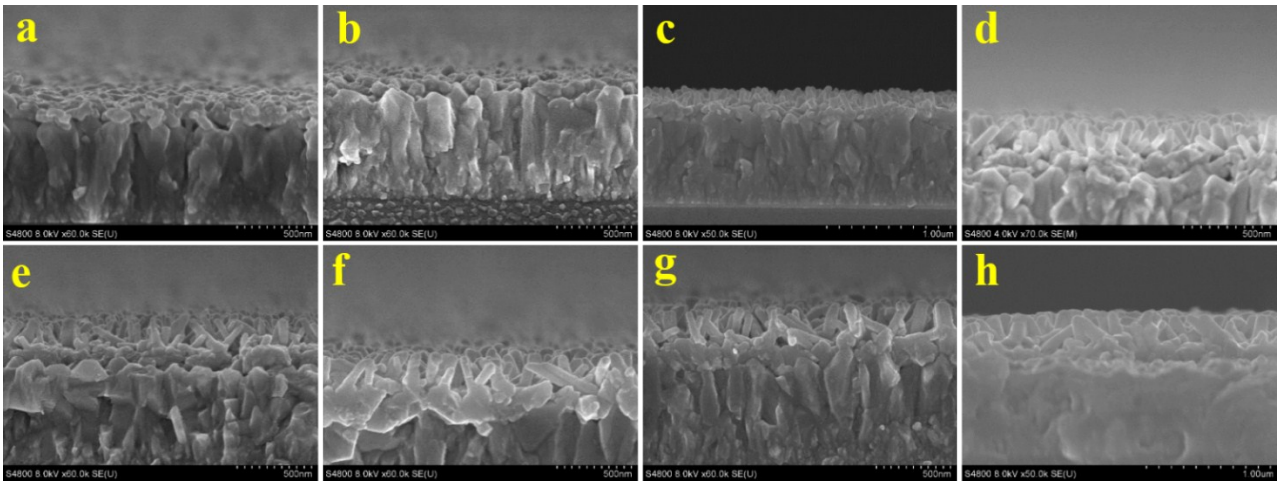


Fig. S6 Cross-sectional SEM images of different spin loops for $AgBiS_2$ film on FTO: a) to h) corresponding to 1spin loop to 8 spin loops.

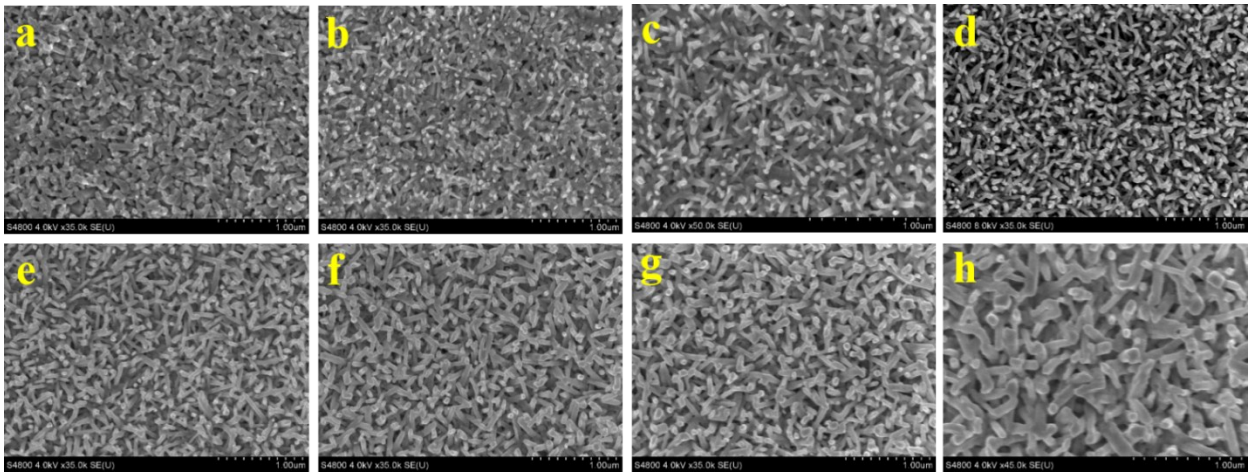


Fig. S7 Top-view SEM images of different spin loops for $AgBiS_2$ film on FTO: a) to h) corresponding to 1spin loop to 8 spin loops.

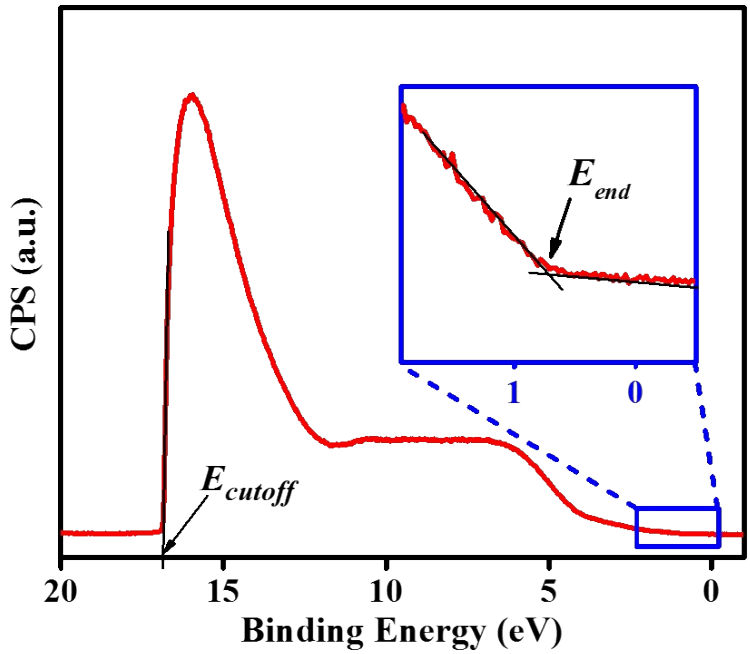


Fig. S8 Ultraviolet photoelectron spectroscopy (UPS) is used to determine the Fermi energy (EF) and the valence band energy (E_v) level or HOMO. E_F is calculated from the equation: E_F (Fermi energy) = 21.21 eV (He I) -E_{cutoff}. HOMO = E_F + E_{end}; LUMO = HOMO - E_g (Band gap).

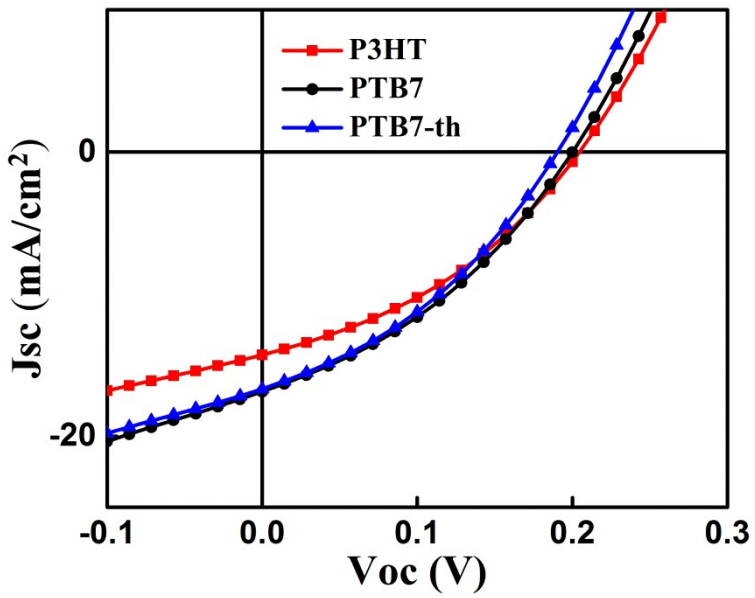


Fig. S9 $AgBiS_2$ solar cells with P3HT, PTB7, PTB7-th as hole transport layers for comparison.

Table S1 The parameters of $AgBiS_2$ solar cells with different hole transport layers.

Material	V_{oc} (V)	J_{sc} (mA/cm^2)	FF (%)	PCE (%)
P3HT	0.211	15.679	37.466	1.238
PTB7	0.200	16.853	35.605	1.199
PTB7-th	0.190	16.644	36.134	1.144