Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Solution-processed $AgBiS_2$ Photodetectors from Molecular Precursors

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Supporting figures

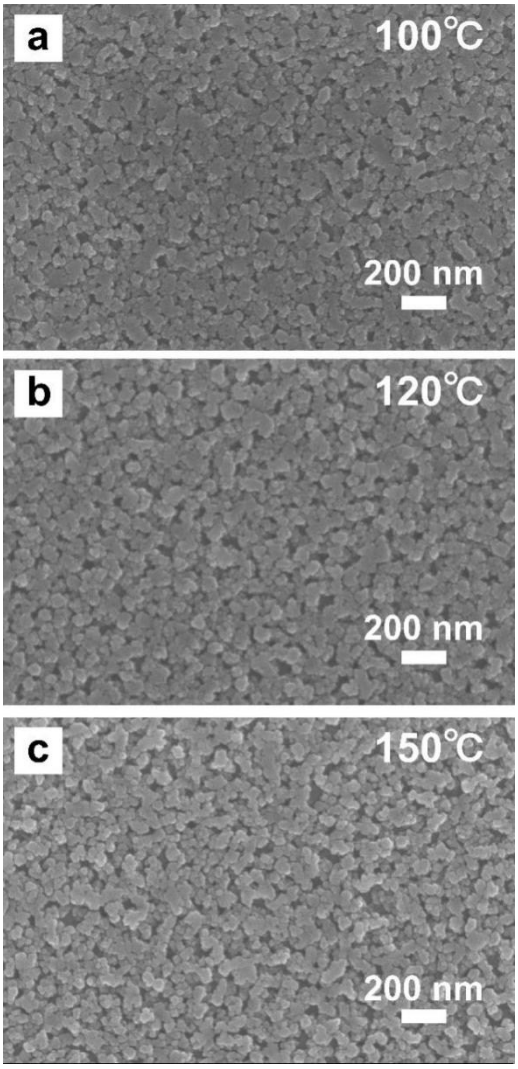

Fig. S1 SEM images of $AgBiS_2$ films annealed at different initial temperatures.

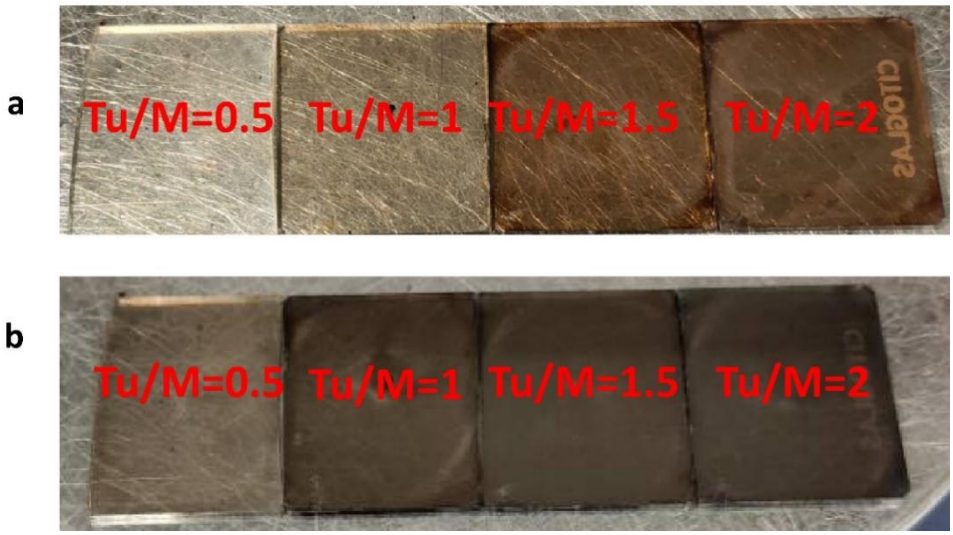

Fig. S2 (a) Comparison of $AgBiS_2$ films annealed at initial temperature of 100°C and **(b)** the final optical photos of the obtained films annealed at 200°C with various thiourea/metal ratios.

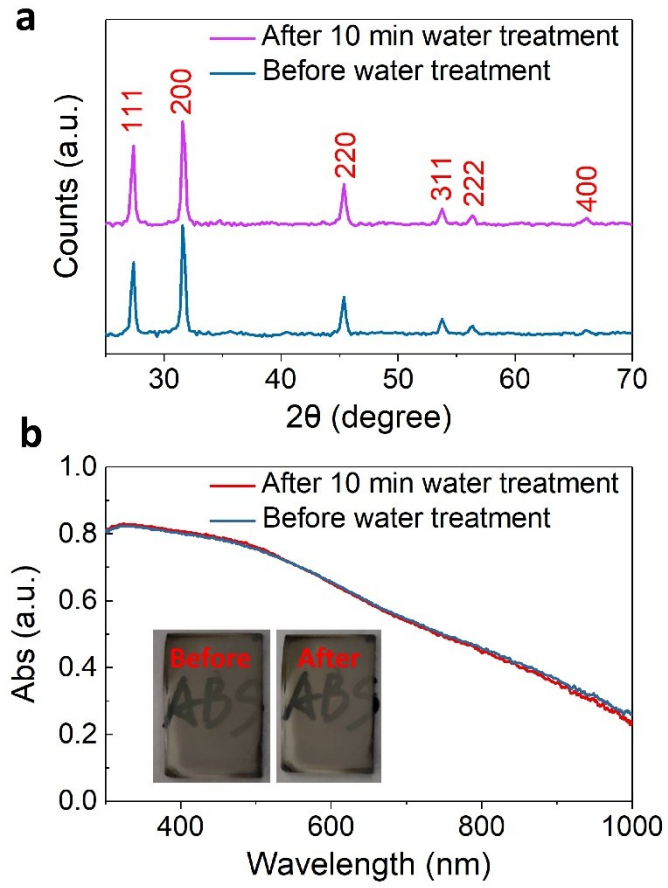

Fig. S3 (a) XRD patterns and **(b)** absorption spectra of $AgBiS_2$ films with or without water treatment.

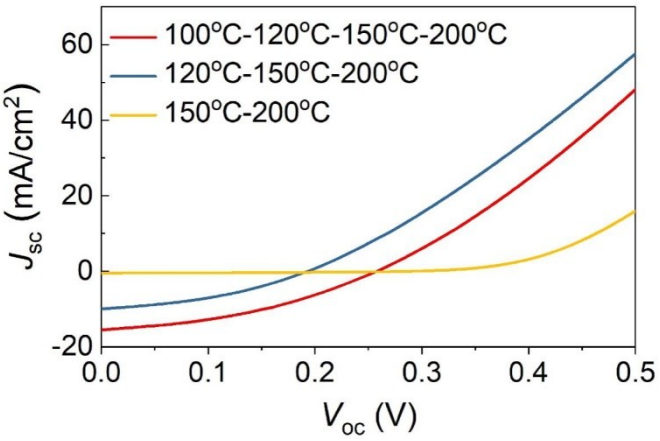

Fig. S4 *J-V* curves of $AgBiS_2$ devices annealed at different initial temperatures.

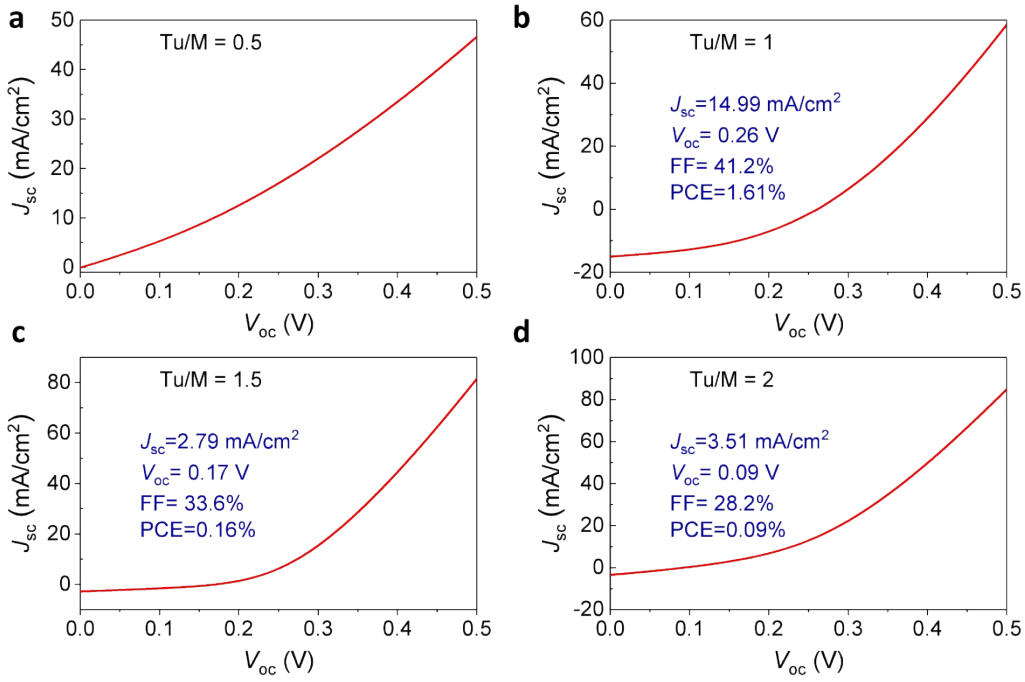

Fig. S5 *J-V* curves of $AgBiS_2$ devices prepared with different Tu/M ratios.

Table S1 Summary of device performance of $AgBiS_2$ photodiodes fabricated at different humidity levels.

J_{sc} (mA/cm^2)	V_{oc} (V)	FF (%)	PCE (%)	Humidity (%)
4.61	0.06	25.9	0.07	70%~80%
7.52	0.21	18.3	0.29	60%~70%
10.5	0.19	38.5	0.77	50%~60%
15.5	0.25	39.5	1.53	40%~45%
18.4	0.21	34	1.3	35%~40%
8	0.25	40.1	0.82	~30%
7.47	0.07	33.3	0.17	Glovebox

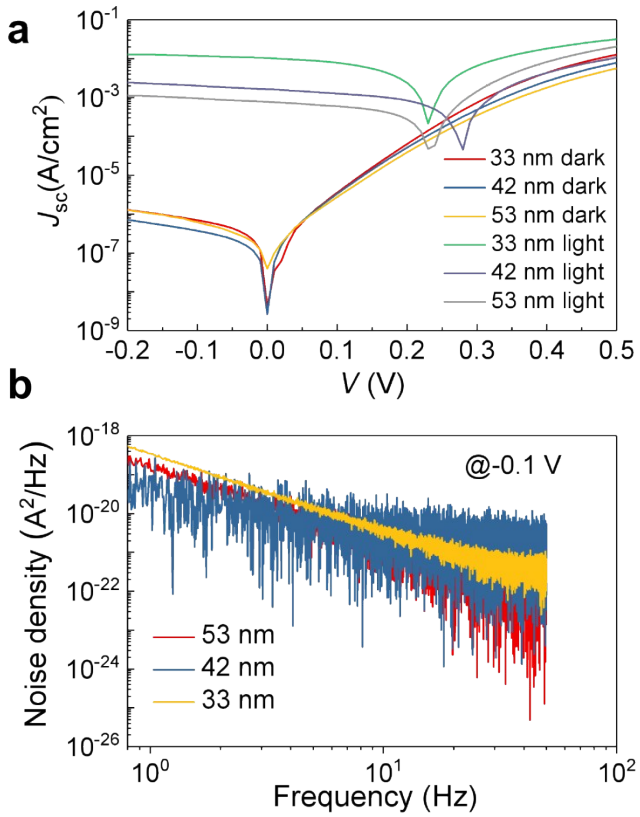

Fig. S6 Comparison of (a) dark and photocurrent and (b) noise density spectra of $AgBiS_2$ photodetectors with various active layer film thicknesses.

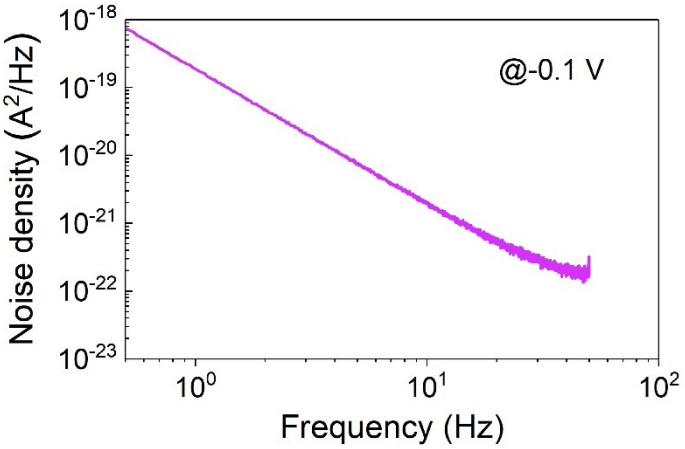

Fig. S7 Noise density of optimized $AgBiS_2$ photodetectors measured at -0.1 V.

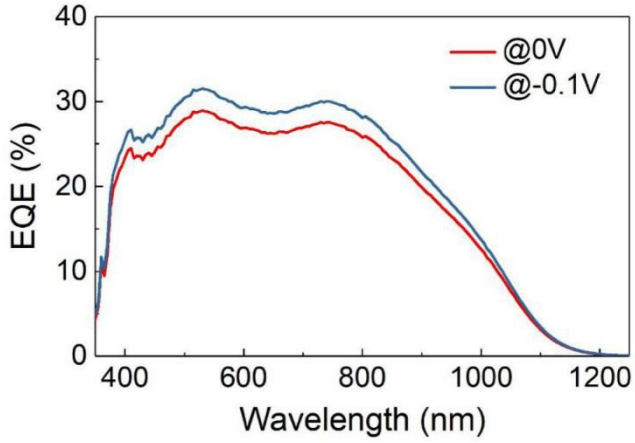

Fig. S8 EQE spectra of $AgBiS_2$ photodetectors measured at different bias voltage.

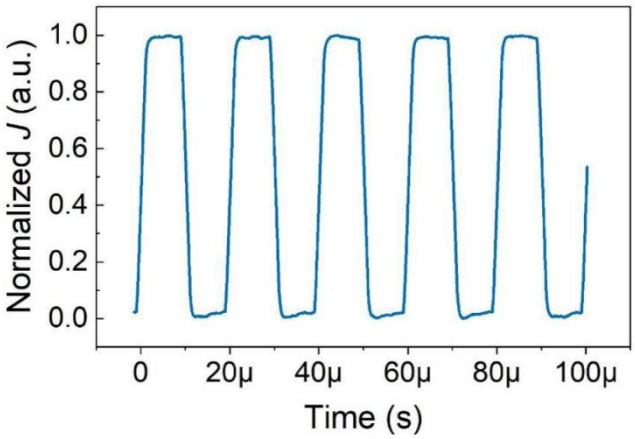

Fig. S9 Repeated photoresponse for a number of cycles under a modulated 630 nm LED.

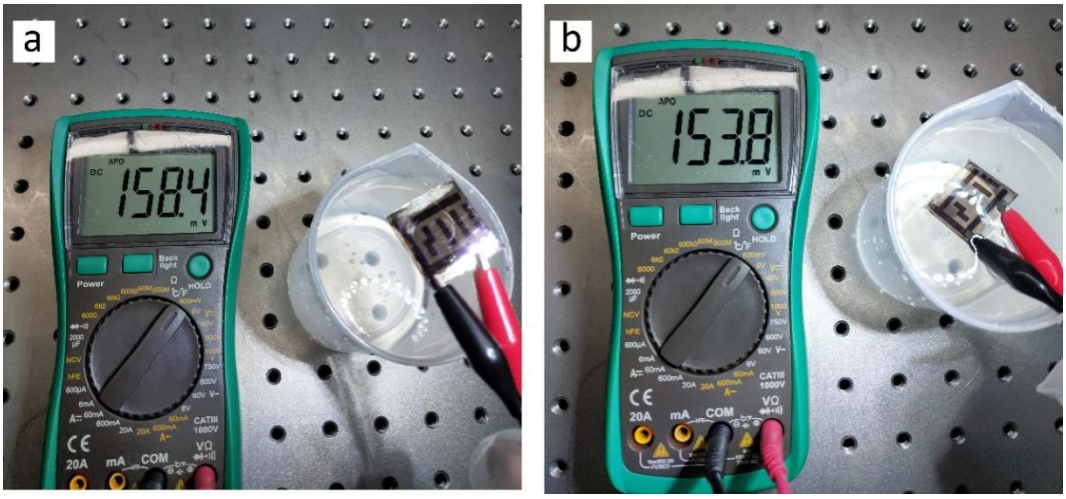

Fig. S10 Open-circuit tracking of $AgBiS_2$ photodiodes **(a)** in air and **(b)** in water lasting for one minute under white light LED irradiation.