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Supporting Information

High-performance Optoelectronic Memory Based on Bilayer MoS2 grown by Au catalyst

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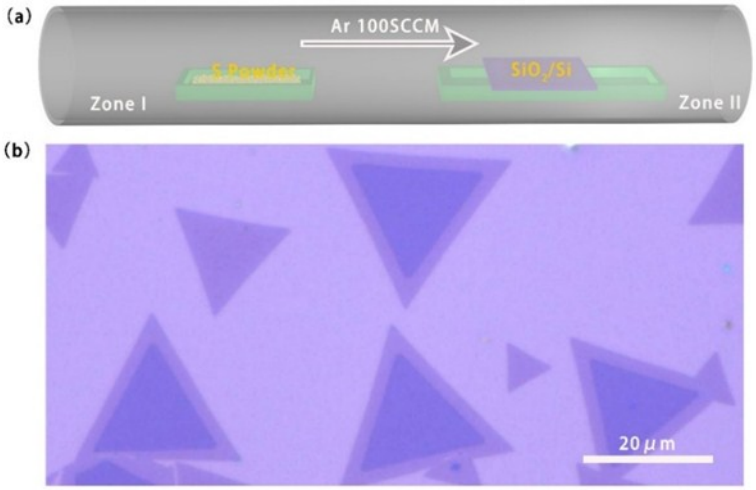

Fig. S1 Monolayer and bilayer MoS2 directly synthesis on SiO2/Si substrate without functionated pretreatment. (a) Schematic of the CVD setup for synthesis the monolayer and bilayer MoS2. (b) Optical microscope image of MoS2 grown on SiO2/Si substrate by CVD.

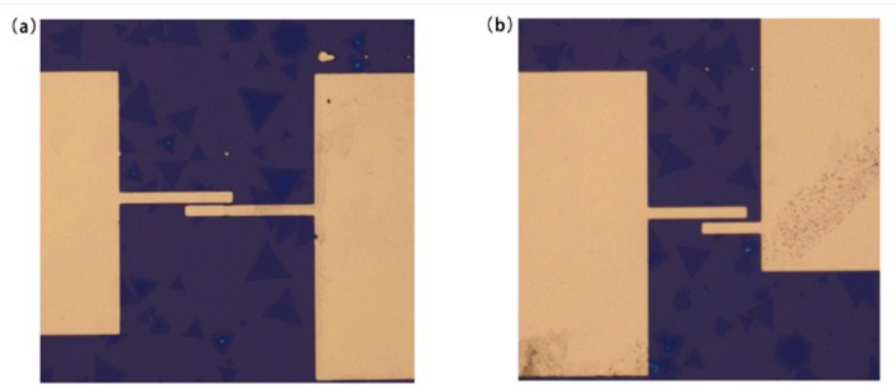

Fig. S2 Optical images of optoelectronic memory based on the monolayer and bilayer MoS2

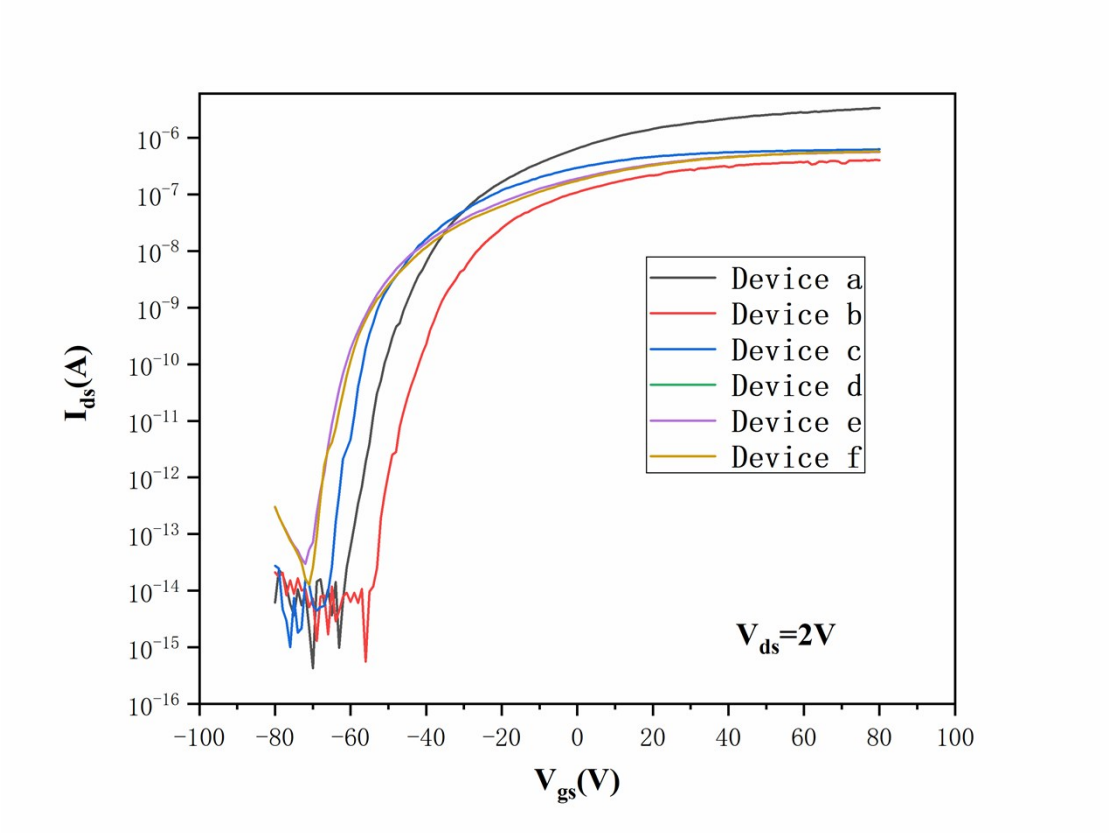

Fig. S3 Transfer characteristics of the Different devices at V_{ds} = 2 V.

Table S1 Ra and Ra of the monolayer and bilayer MoS2.

Roughness	Ra (nm)	Rq (nm)
Monolayer MoS2	0.131	0.173
Bilayer MoS2	0.0849	0.107

Table S2 Comparison between existing MoS_2 memory and our bilayer MoS_2 memory..

MoS_2 memory structure	**on/off ratio**	**Retention time**	**Cyclic**	**Reference**
Planar Au/Ti/MoS_2/Ti/Au	8×10^4	2.2×10^4 s	>10	Our work
Planar Au/Cr/MoS_2/Cr/Au/ substrate Si/Au/Al2O3/AuNPs/cPVP	$\sim10^5$	10^3 s	>200	*ACS Appl. Mater. Interfaces* 2017, 9, 31, 26357-26362
Planar Au/MoS_2 /Au	4700	10^4 s	———	*Nature communications,* 2017, 8, 14734