



Supporting Information

for

Synchrotron X-ray photoelectron spectroscopy study of sodium adsorption on vertically arranged MoS₂ layers coated with pyrolytic carbon

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EDX spectroscopy study of Pt layers protecting MoS₂ surface, XPS survey spectra of the studied samples, and XPS Na 2s spectra of the sodiated samples

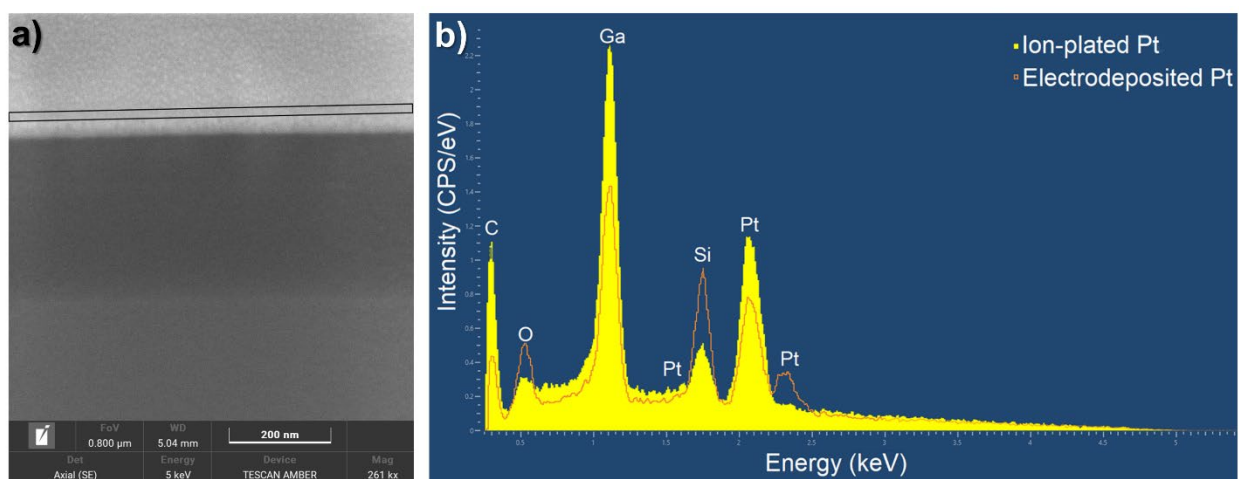


Figure S1: (a) SEM image of the cross-sectional view of the MoS₂ film obtained using a Mo layer sputtered for 90 s. Two horizontal lines show the area for recording EDX spectra. (b) EDX spectra of the electrodeposited Pt layer (orange) and ion-plated Pt layer (yellow).

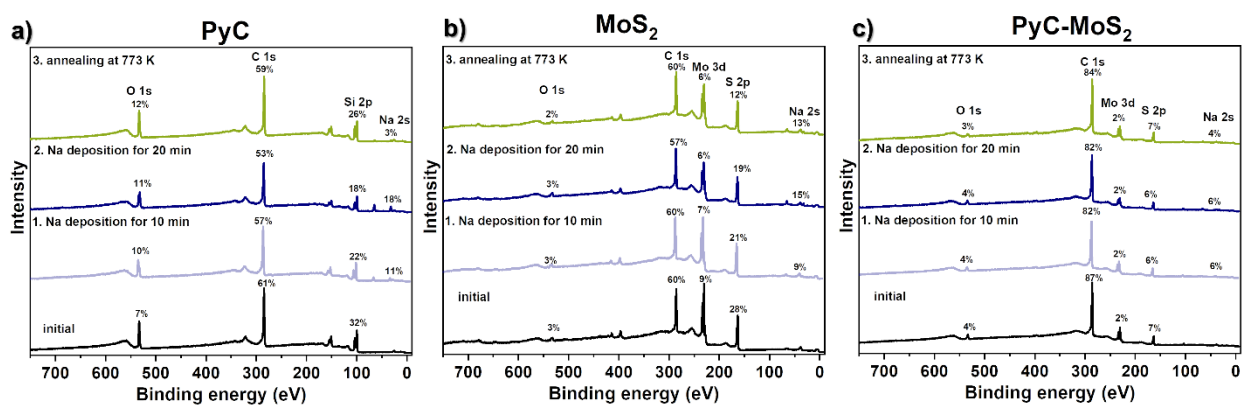


Figure S2: XPS survey spectra of (a) PyC, (b) MoS₂, and (c) PyC-MoS₂ films measured at 830 eV before and after each stage of the sample processing.

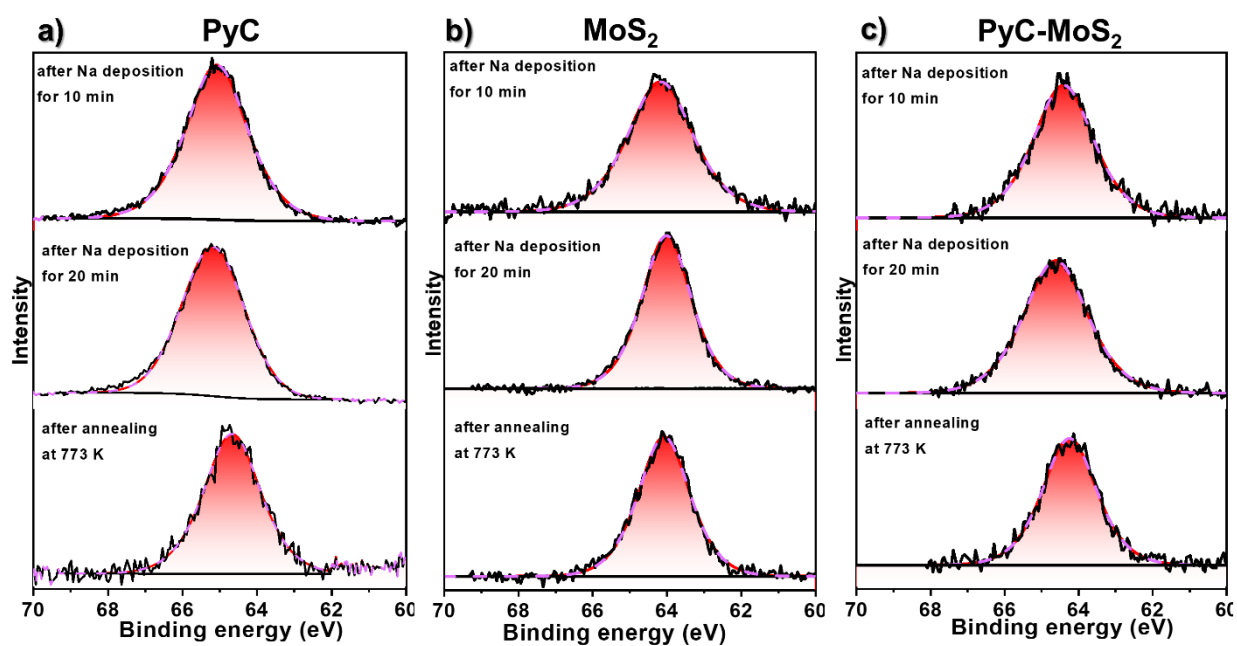


Figure S3: XPS Na 2s spectra measured for (a) PyC, (b) MoS₂, (c) and PyC-MoS₂ samples after sodium deposition and subsequent annealing in UHV.

Table S1: The XPS spectra fitting parameters for initial PyC, MoS₂, and PyC-MoS₂ samples.

Spectrum	Peak assignment	Position, eV	FWHM, eV	Line Shape	Raw Area, CPS
PyC					
C 1s	C sp ²	284.4	1.11	LF(0.5,0.9,100,300)	28603
	C-O	286.4	1.68	GL(60)	608
	π* sat.	290.4	2.42	GL(60)	739
MoS₂					
Mo 3d	2H-MoS ₂ 3d _{5/2}	228.9	0.87	GL(60)	17696
	2H-MoS ₂ 3d _{3/2}	232.0	1.06	GL(60)	11797
	Mo ⁵⁺ 3d _{5/2}	230.2	1.24	GL(60)	1456
	Mo ⁵⁺ 3d _{3/2}	233.4	1.24	GL(60)	971
	Mo ⁶⁺ 3d _{5/2}	231.7	1.24	GL(60)	972
	Mo ⁶⁺ 3d _{3/2}	234.9	1.24	GL(60)	648
S 2p	metal rich S 2p _{3/2}	160.5	1.08	GL(60)	514
	metal rich S 2p _{1/2}	161.7	1.08	GL(60)	257
	2H-MoS ₂ 2p _{3/2}	161.7	0.83	GL(60)	9813
	2H-MoS ₂ 2p _{1/2}	162.9	0.83	GL(60)	4906
	S ₂ ²⁻ and polysulfide groups 2p _{3/2}	163.4	1.24	GL(60)	1502
	S ₂ ²⁻ and polysulfide groups 2p _{1/2}	164.6	1.24	GL(60)	751
PyC-MoS₂					
C 1s	C sp ²	284.3	1.17	LF(0.55,0.9,100,300)	37926
	C-O	286.4	1.51	GL(60)	264
	π* sat.	290.0	2.48	GL(60)	796
Mo 3d	2H-MoS ₂ 3d _{5/2}	228.9	0.85	GL(60)	5770
	2H-MoS ₂ 3d _{3/2}	232.1	1.07	GL(60)	3847
	Mo ⁵⁺ 3d _{5/2}	230.3	1.25	GL(60)	409
	Mo ⁵⁺ 3d _{3/2}	233.5	1.25	GL(60)	273
	Mo ⁶⁺ 3d _{5/2}	231.9	1.25	GL(60)	334
	Mo ⁶⁺ 3d _{3/2}	235.0	1.25	GL(60)	223
S 2p	metal rich S 2p _{3/2}	160.6	1.05	GL(60)	201
	metal rich S 2p _{1/2}	161.8	1.05	GL(60)	100
	2H-MoS ₂ 2p _{3/2}	161.8	0.83	GL(60)	3327
	2H-MoS ₂ 2p _{1/2}	163.0	0.83	GL(60)	1664
	S ₂ ²⁻ and polysulfide groups 2p _{3/2}	160.6	1.05	GL(60)	201
	S ₂ ²⁻ and polysulfide groups 2p _{1/2}	161.8	1.05	GL(60)	100