Supplementary Information

Oriented lateral growth of monolayer MoS_2 mediated by highly-oriented MoO_2 nanorods on sapphire

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Table S1. A comparison of Raman characteristic peaks FWHMs of monolayer HO-MS in this work with previous reports.

TMDs	Growth substrate	E^1_{2g} FWHM(cm^{-1})	A_{1g} FWHM (cm^{-1})	Reference
MoS_2	sapphire	4.2	4.9	This work
MoS_2	sapphire	4.2 ± 0.2	5.0 ± 0.2	[1]
MoS_2	sapphire	4.0 ± 0.3	4.2	[2]
MoS_2	SiO_2/Si	4.1	4.5	[3]
MoS_2	sapphire	4.4 ± 0.3	4.8 ± 0.2	[4]
MoS_2	sapphire	4.6 ± 0.2	5.1 ± 0.3	[5]

By estimating the reported graphs, the previously reported FWHMs with an error range was obtained.

Table S2. A comparison of PL FWHMs of monolayer HO-MS in this work with previous reports.

TMDs	Growth substrate	Temperature(K)	PL FWHM (meV)	Reference
MoS_2	sapphire	Rt.	56	This work
MoS_2	sapphire	Rt.	58	[2]
MoS_2	SiO_2/Si	Rt.	55	[3]
MoS_2	sapphire	Rt.	56	[4]
MoS_2	SiO_2/Si	80	55	[6]
MoS_2	sapphire	Rt.	57	[7]

By estimating the reported graphs, the previously reported FWHMs with an error range was obtained. Rt. represents room temperature.

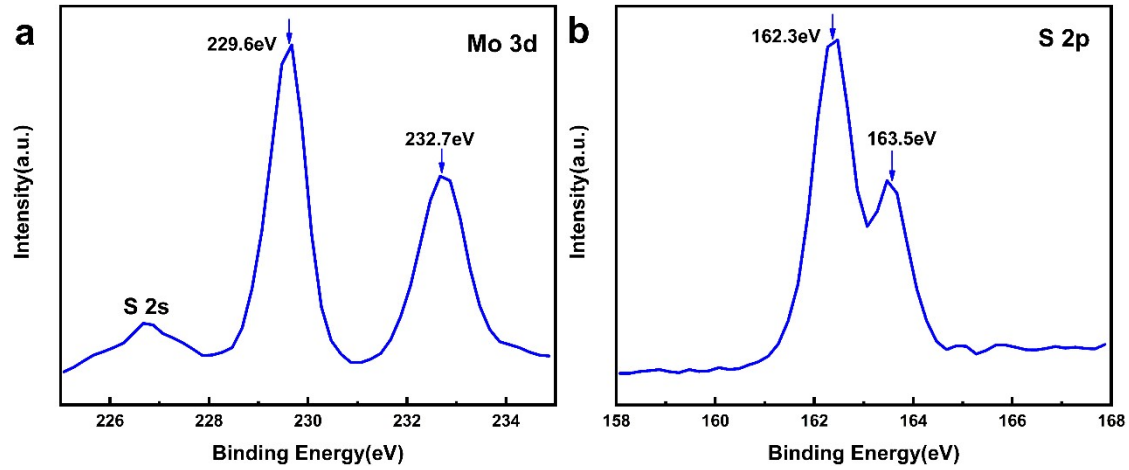

Figure S1. XPS results of HO-MS. (a) High-resolution spectrum of the Mo 3d peaks. (b) High-resolution spectrum of the S 2p peaks.

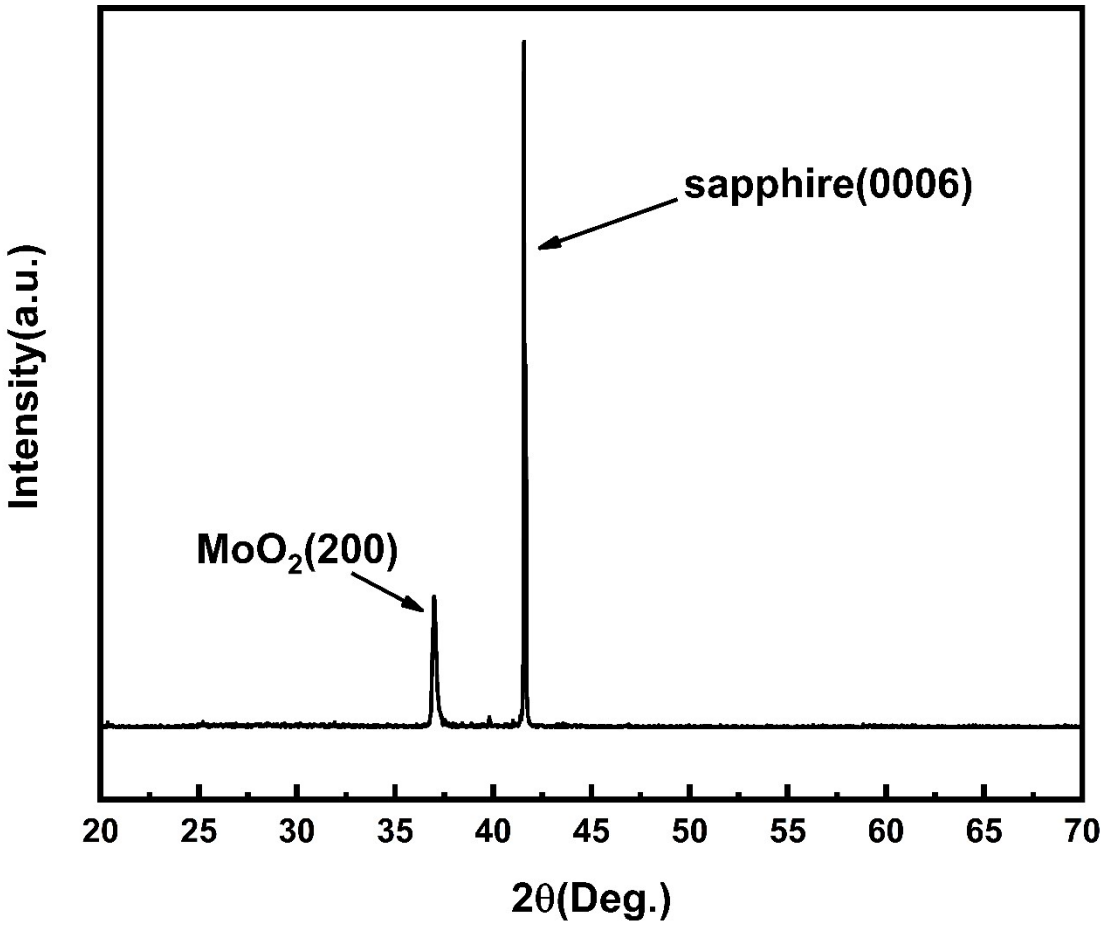

Figure S2. XRD pattern of HO-MS.

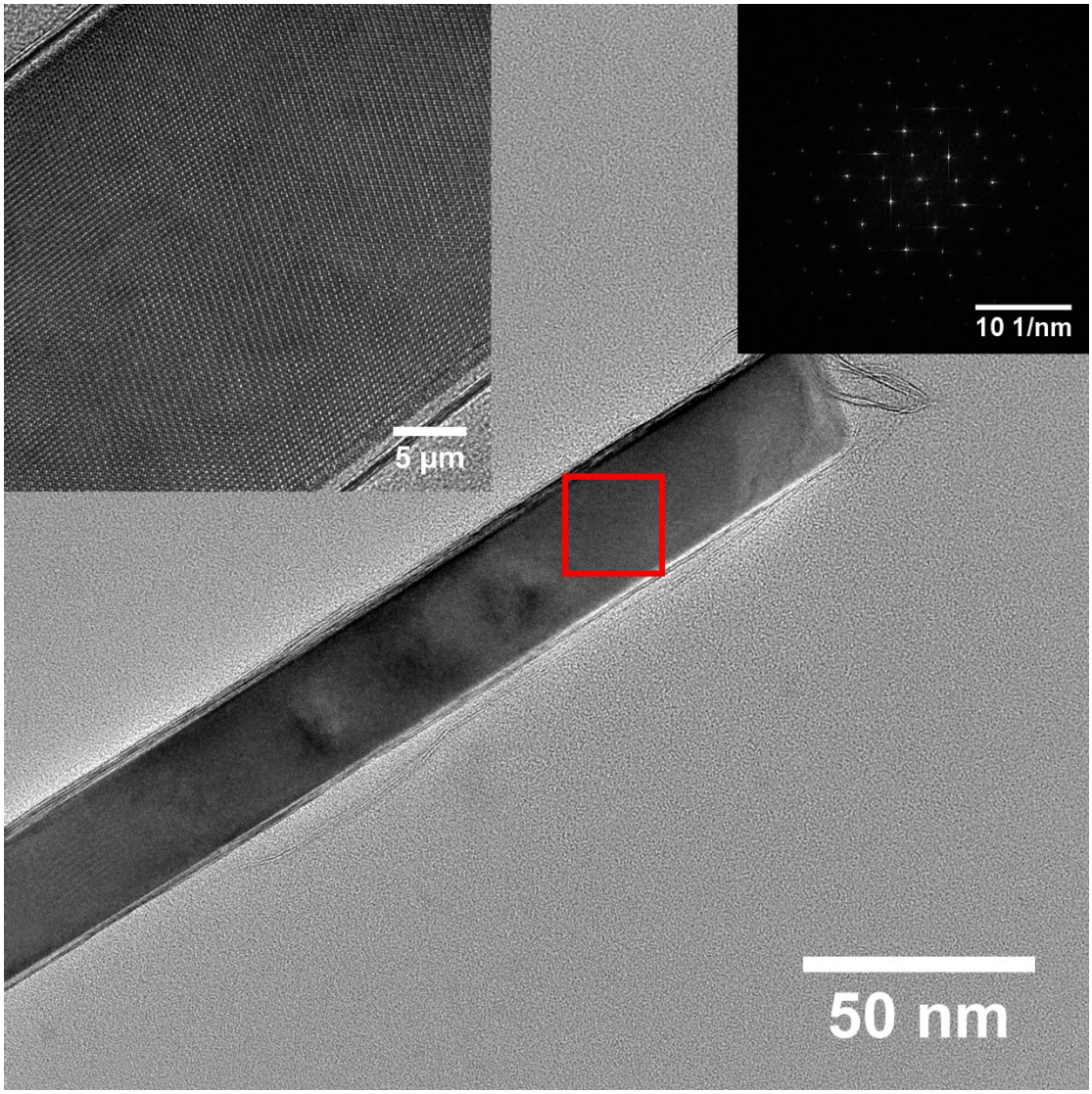

Figure S3. TEM image of MoO_2 nanorod. The two insets correspond to an enlarged TEM image and FFT pattern of the boxed area.

References

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