Electronic Supplementary Material (ESI) for New Journal of Chemistry.

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Table S1 MoS2 samples and SERS effect

	Van der Waals interaction			C=C and C=O bonds coordination			-NH <sub>2</sub> coordination		
RhB	10ppm	1ppm	0.1ppm	10ppm	1ppm	0.1ppm	10ppm	1ppm	0.1ppm
MoS <sub>2</sub> (A)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(√)	(×)	(×)	(√)	(√)	(×)	(√)	(√)	(√)
MoS <sub>2</sub> (B)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
	(√)	(×)	(×)	(√)	(√)	(×)	(×)	(×)	(×)
MoS <sub>2</sub> (C)	Yes	Yes	Yes	No	No	No	No	No	No
	(√)	(×)	(×)	(×)	(×)	(×)	(×)	(×)	(×)

Illustration: 1) Yes or No suggests there exist this kind of interaction or not

2) (  $\checkmark$  ) or ( $\times$ ) means this interaction is contributes to the SERS effect or not

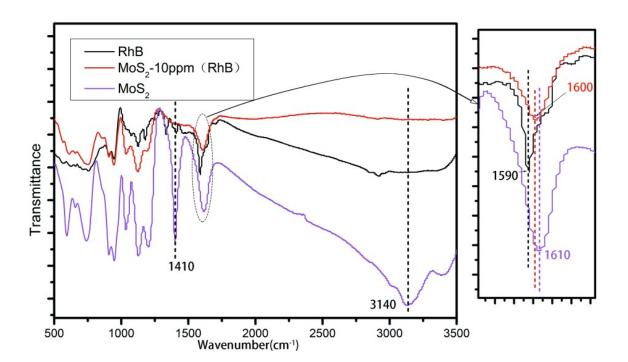
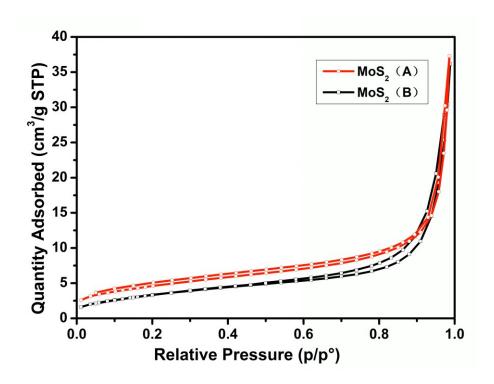


Figure S1 FT-IR spectra of MoS<sub>2</sub>, MoS<sub>2</sub>-10ppm RhB and RhB



 $\textbf{Figure S2} \qquad N_2 \text{ adsorption-desorption isotherms of } MoS_2(A) \text{ and } MoS_2(B)$ 

The BET surface area of  $MoS_2(A)$  is  $16.7632\pm0.0730$  m<sup>2</sup>/g, and after annealing:  $12.9093\pm0.1372$  m<sup>2</sup>/g. That is, the annealing process reduced the specific surface area of  $MoS_2$  by about 25%, and the reduction was not enough to cause a huge change of SERS effect.