

## Supporting Information

# Intermixed $\text{WS}_2+\text{MoS}_2$ Nanodisks/Graphene van der Waals Heterostructures for Surface-Enhanced Raman Spectroscopy Sensing

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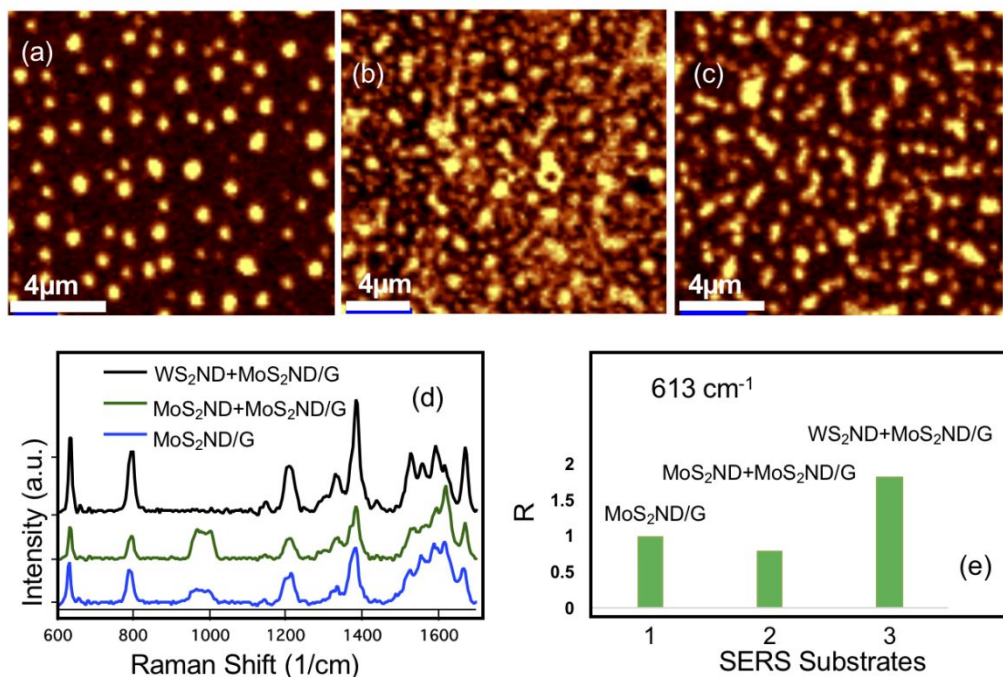
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**Figure S1** shows the Raman map of three samples (a)  $\text{MoS}_2$  of  $\text{MoS}_2\text{NDS/graphene}$ , (b)  $\text{MoS}_2$  of  $\text{MoS}_2\text{NDs}+\text{MoS}_2\text{NDS/graphene}$  sample, and (c) Raman maps of  $\text{MoS}_2\text{NDs}$  and  $\text{WS}_2\text{NDs}$  ( $A_{1g}$  mode) of  $\text{WS}_2\text{NDs}+\text{MoS}_2\text{NDS/graphene}$  sample. (d) shows Raman spectra of R6G molecules at the concentration of  $5 \times 10^{-5}\text{M}$  deposited on the three samples (e) The ratio (R) of the  $613\text{ cm}^{-1}$  R6G peak intensity of the SERS substrates of  $\text{MoS}_2/\text{G}$ ,  $\text{MoS}_2\text{NDs}+\text{MoS}_2\text{NDs/graphene}$  and  $\text{WS}_2\text{NDs}+\text{MoS}_2\text{NDs/graphene}$  to the same peak on  $\text{MoS}_2/\text{G}$ .



**Figure S1.** (a) A representative Raman map of MoS<sub>2</sub> ( $A_{1g}$  mode) of MoS<sub>2</sub>NDS/graphene, (b) A representative Raman map of MoS<sub>2</sub> ( $A_{1g}$  mode) of MoS<sub>2</sub>NDS+MoS<sub>2</sub>NDS/graphene sample, (c) Raman maps of MoS<sub>2</sub>NDS and WS<sub>2</sub>NDS ( $A_{1g}$  mode) of WS<sub>2</sub>NDS+MoS<sub>2</sub>NDS/graphene sample. (d) Raman spectra of R6G molecules at the concentration of  $5 \times 10^{-5}$  M deposited on WS<sub>2</sub>NDS+MoS<sub>2</sub> NDS/graphene (black), MoS<sub>2</sub>NDS+MoS<sub>2</sub> NDS/graphene (green), and MoS<sub>2</sub>NDS/graphene (blue) heterostructures substrates. (e) The ratio (R) of the 613  $\text{cm}^{-1}$  R6G peak intensity of the SERS substrates of MoS<sub>2</sub>/G to the same peak on MoS<sub>2</sub>/G (column 1), MoS<sub>2</sub>NDS+MoS<sub>2</sub>NDS/graphene (Column 2), and WS<sub>2</sub> NDS+MoS<sub>2</sub>NDS/graphene (Column 3).