

Supporting Information

# Synthesis of Strongly Fluorescent Molybdenum Disulfide Nanosheets for Cell-targeted Labelling

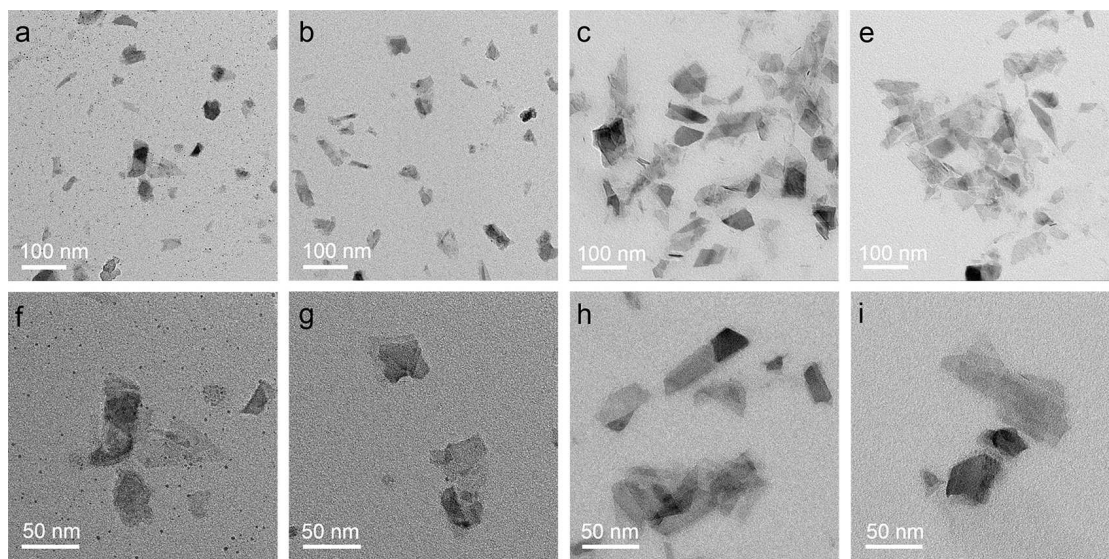
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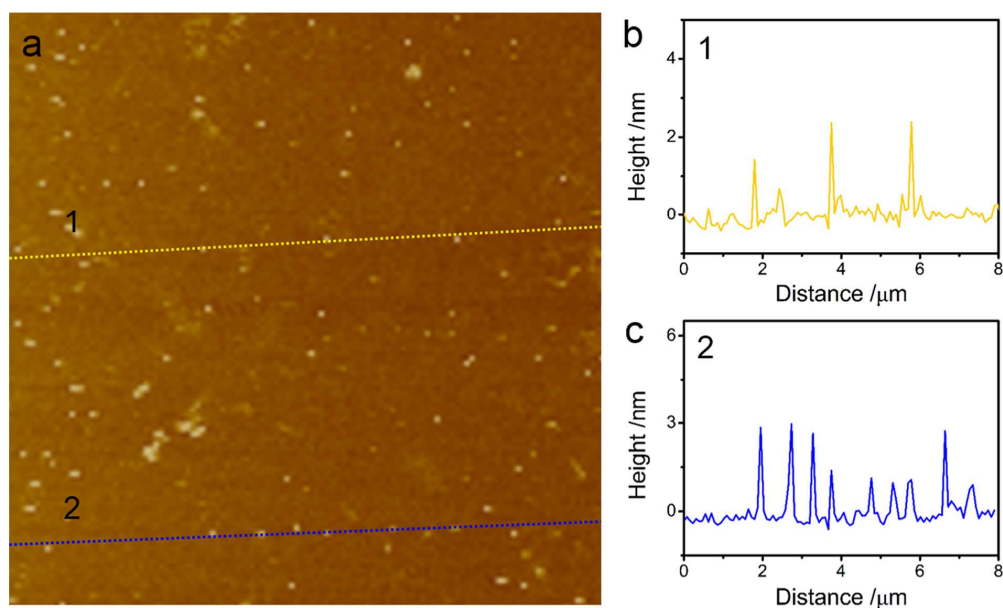
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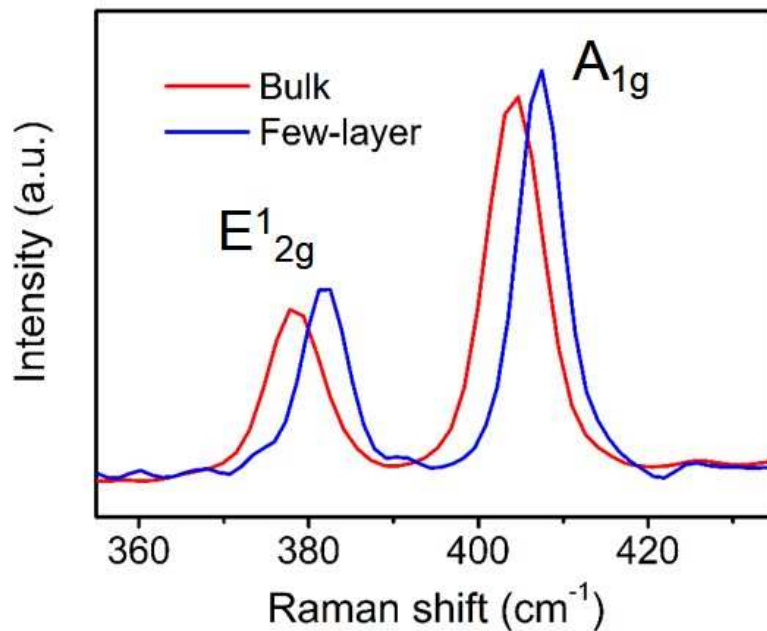
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**Figure 1S** (a-i) Additional TEM images of MoS<sub>2</sub> nanosheets with small lateral dimensions.



**Figure 2S** (a) AFM image of MoS<sub>2</sub> nanosheets with small lateral dimensions. (b, c) Height profiles along the yellow (1) and blue (2) lines shown in the AFM images (a), respectively. The line was plotted to across the dots' centers to minimize measurement errors.



**Figure 3S.** Raman spectra of the few-layer and bulk MoS<sub>2</sub>.

Raman spectroscopy is also utilized here to further investigate the crystal structure of the 2D MoS<sub>2</sub> nanosheets. In Fig. 3S, the Raman spectroscopy indicates that the deposited MoS<sub>2</sub>/PVP composites show the distinct Raman fingerprint of the 2H-MoS<sub>2</sub> crystal with no evidence of structural distortion.<sup>1,2</sup> This shows that the interaction with PVP has not changed the structure or material properties of MoS<sub>2</sub> in any significant way.<sup>3</sup> The obtained few-layer MoS<sub>2</sub> presented two distinguished Raman features at 382.7 cm<sup>-1</sup> and 407.4 cm<sup>-1</sup>, which correspond to E<sup>1</sup><sub>2g</sub> (in-plane vibration of two S atoms with respect to the Mo atom) and A<sub>1g</sub> (out-of-plane vibration of S atoms) mode, respectively. The frequency difference of these two peaks depends on the number of layers of MoS<sub>2</sub> in the case of less than 10 monolayers and increases with an increase in the number of layers. As shown in Fig. 3S, the 2D MoS<sub>2</sub> have a smaller Raman shift difference between E<sup>1</sup><sub>2g</sub> and A<sub>1g</sub> modes ( $\Delta=24.7$  cm<sup>-1</sup>) in comparison with  $\Delta=26.9$  cm<sup>-1</sup> from their bulk counterpart. According to the “ $\Delta$ -thickness relation” established by previous works based on

exfoliated samples, the Raman spectra indicate that the thicknesses of 2D MoS<sub>2</sub> nanosheets are mostly less than 5 monolayers (<4 nm),<sup>4</sup> which is in parallel with the AFM measurements (Fig. 1j,k).

## REFERENCES

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