

## Supporting Information

### Shape-dependent close-edge 2D-MoS<sub>2</sub> nanobelts

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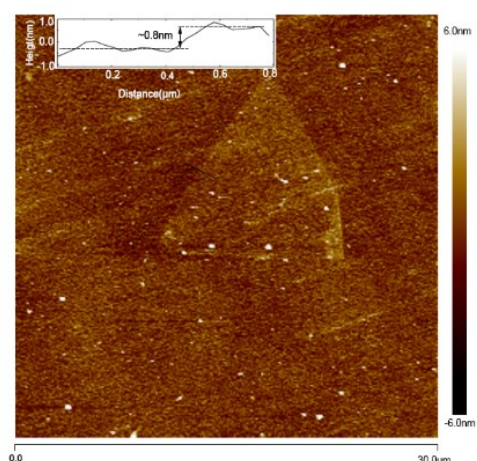
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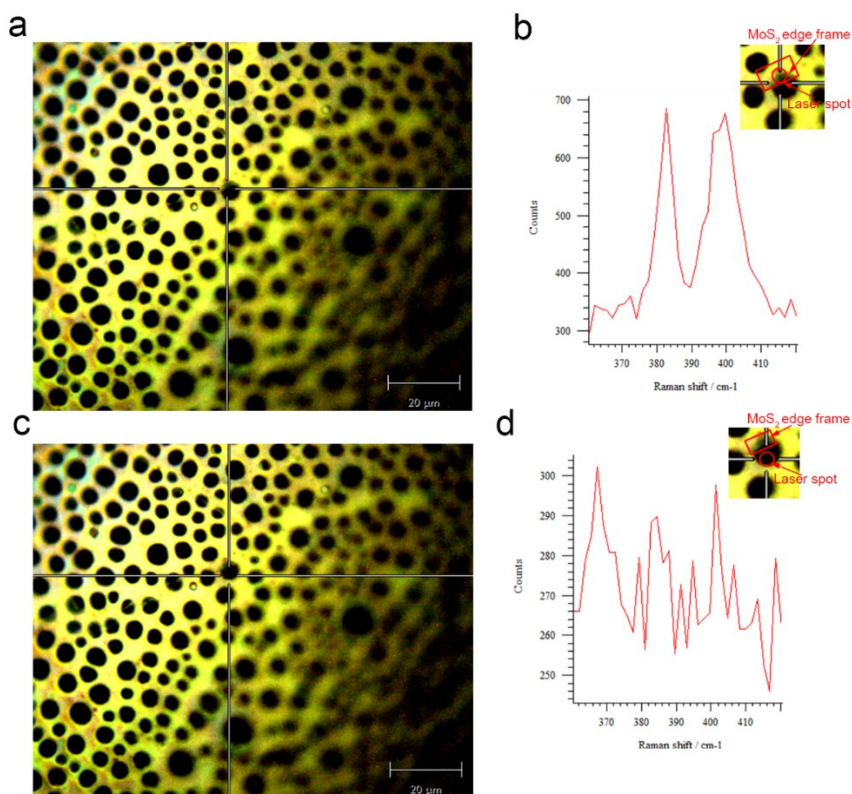
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## Section 1 Height of as-grown monolayer MoS<sub>2</sub>



**Figure 1** Height of as-grown monolayer MoS<sub>2</sub> Height of as-grown monolayer MoS<sub>2</sub> is around 0.8nm and slightly lower than nanobelt after peeling process.

## Section 2 MoS<sub>2</sub> edge nanobelt transferred on lacey carbon films

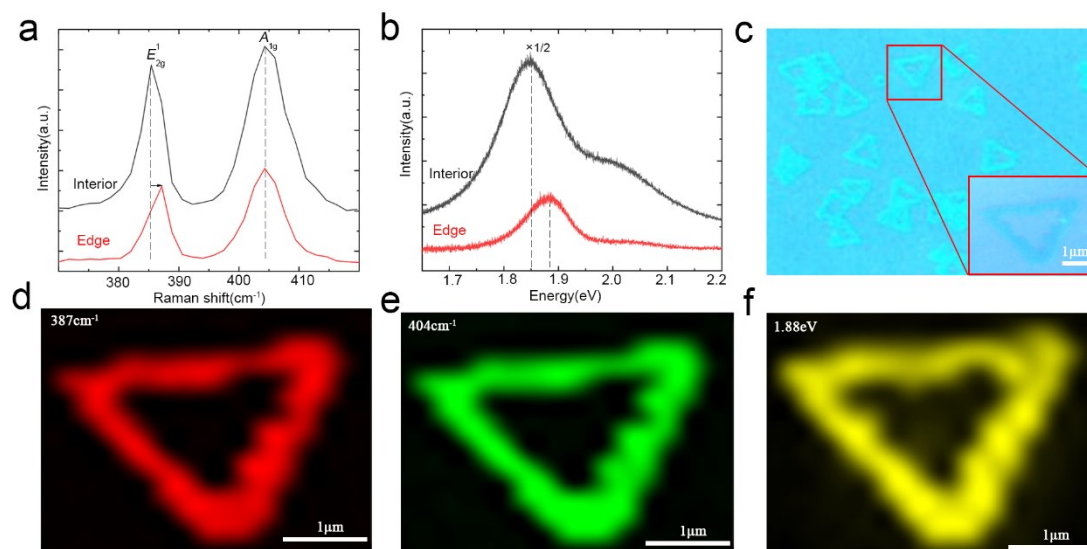


**Figure 2** MoS<sub>2</sub> edge nanobelt transferred on lacey carbon films.(a, b) Raman spectra for edge belt of the MoS<sub>2</sub> on lacey carbon films and corresponding optical microscope image. (c, d) Raman spectra for outside MoS<sub>2</sub>edge belt on lacey carbon films and corresponding optical microscope image.

### Section 3 Spectroscopy difference between edge and interior regions

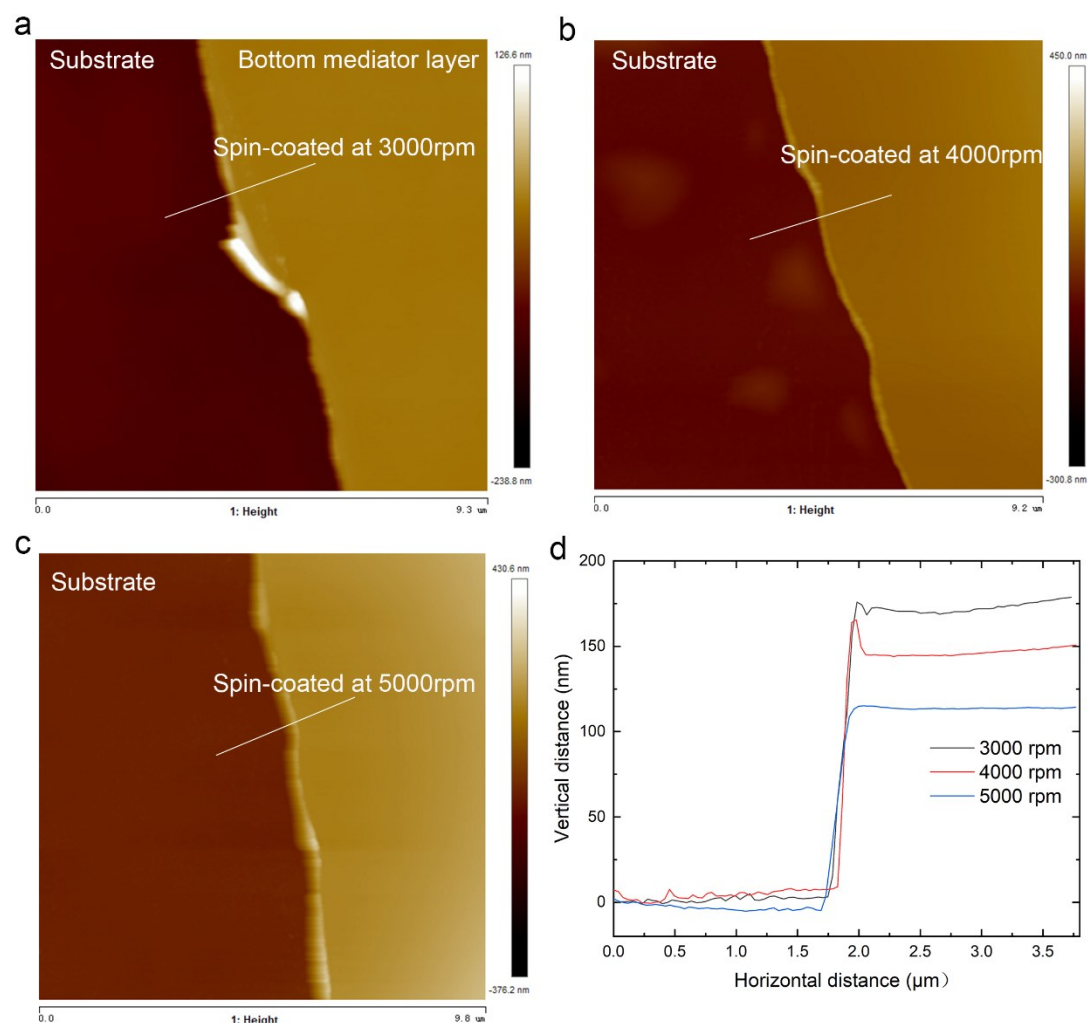
Taking single-layer triangle monocrystal MoS<sub>2</sub> edge belts as an example, we investigated the difference between edge belt obtained by our method and interior region. Figure 3 (a, b) depicts the Raman spectra and photoluminescence (PL) spectra of interior region in the edge belt and as-grown MoS<sub>2</sub> single-layer sheet, which were excited by 532nm laser at room temperature. As shown in Figure 3(a), in the interior region, the out-of-plane Raman A<sub>1g</sub> peak locates at ~404cm<sup>-1</sup> and in-plane E<sub>2g</sub> peak is ~385 cm<sup>-1</sup>; in the edge belt, A<sub>1g</sub> has the same peak position as interior region, but the E<sub>2g</sub> peak has a slight blue-shift from 385 cm<sup>-1</sup> to 387 cm<sup>-1</sup>. The PL peak intensity of the interior region was higher than that of the edge belt, as shown in Figure 3(b). The peak (~1.85eV) corresponds to the A direct excitonic transition of MoS<sub>2</sub>. In the edge belts the A peak has a blue-shift close to 1.88eV. These difference between edge belt and interior region of the single-layer MoS<sub>2</sub> has been demonstrated by Raman and PL spectra, reflecting that energy band structure of the edge belt is different from interior region. This may be caused by a lot of defects (dangling bonds) in the edge belt region.

Figure 3(c) shows optical image of triangle edge belts, and a triangle edge belt in a red box was as PL and Raman mapping sample. Figure 3(d, e) displays Raman intensity mapping at 387 cm<sup>-1</sup> and 404 cm<sup>-1</sup>, respectively, and the PL intensity mapping at 1.88 eV is shown in Figure 3(f). The results show that the mapping images have a good match with the shape of edge belts, indicating uniform and complete closed edge belt structures obtained by single-layer monocrystal MoS<sub>2</sub> sheet.



**Figure 3 Spectroscopy studies of MoS<sub>2</sub> edge frame.** a. Raman spectra for interior and edge region. b. PL spectra for interior and edge region. It is half strength of interior region. c. OM for Raman and PL mapping. d and e. Raman mapping at 387cm<sup>-1</sup> and 404cm<sup>-1</sup> respectively of PL mapping at 1.88eV.

## Section 4 Bottom mediator film with different spin-coating speeds



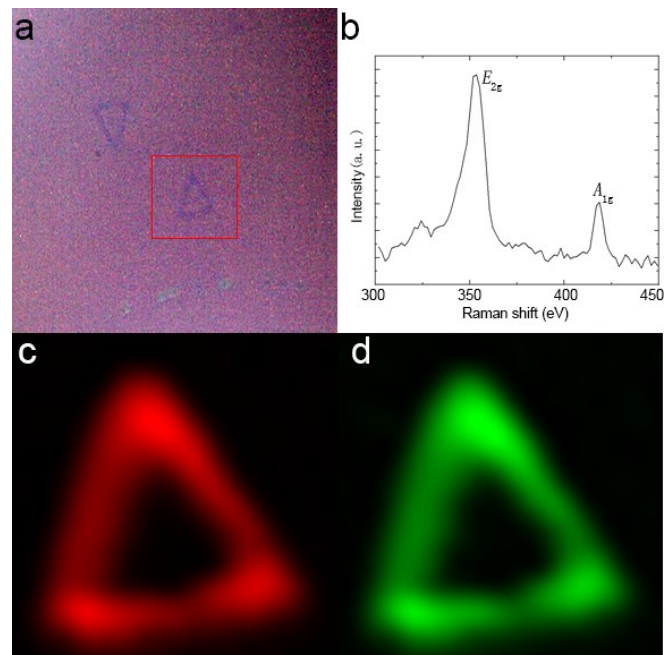
**Figure 4 AFM characterization for the bottom mediator film with different spin-coating speeds.**

(a-c) AFM morphology of the bottom-layer spin-coated at 3000rpm, 4000 rpm, 5000 rpm, respectively.

The adhesion solution component was NVP (1.5 ml), PVP (0.4 g), water (1.5 ml) and ethanol (7.5 ml).

d. Cross-section profiles on the line for the bottom-layer film in (a-c).

## Section 5 Mechanical peeling of monolayer WS<sub>2</sub>



**Figure 5 Raman Spectroscopy of WS<sub>2</sub> edge frame.** a. OM for Raman mapping Raman spectra for interior and edge region. b. Raman spectra for edge region after mechanical peeling process. (c, d) Raman mapping at 353cm<sup>-1</sup> and 418cm<sup>-1</sup> respectively.