

ELECTRONIC SUPPLEMENTARY INFORMATION (ESI)

DNA-Driven Dynamic Assembly of MoS₂ Nanosheets

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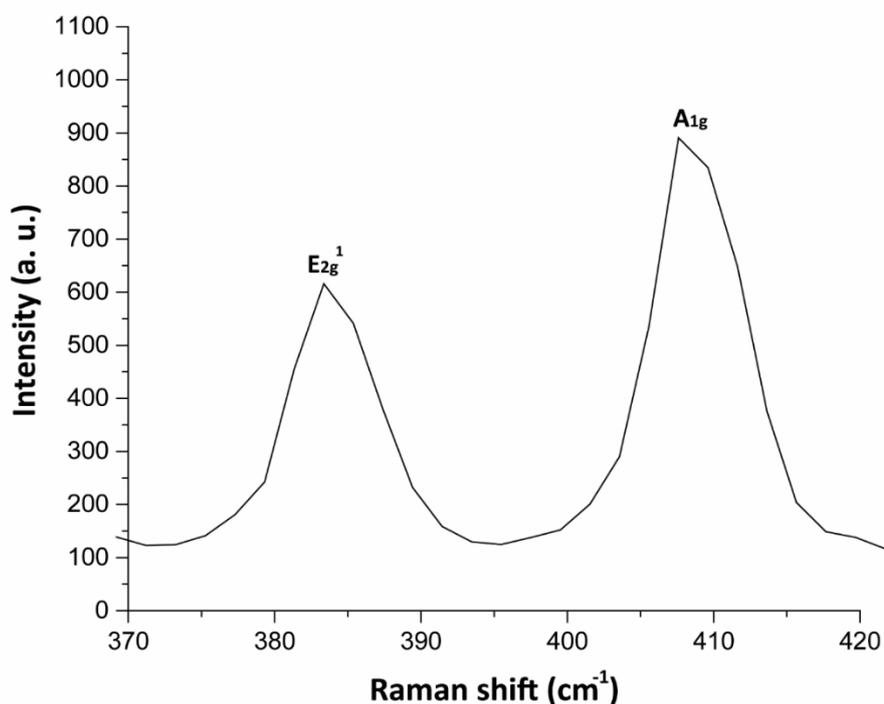
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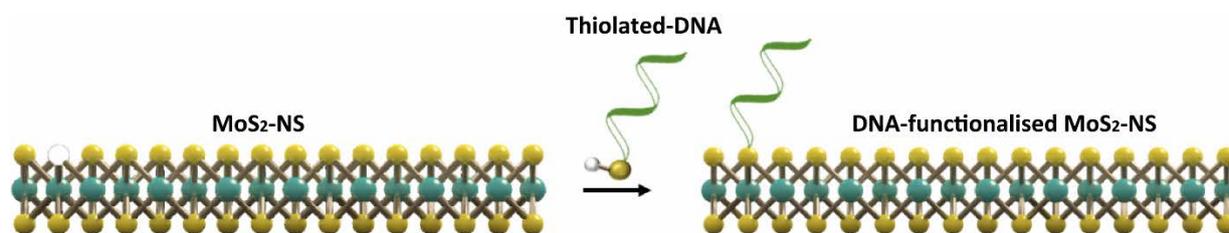
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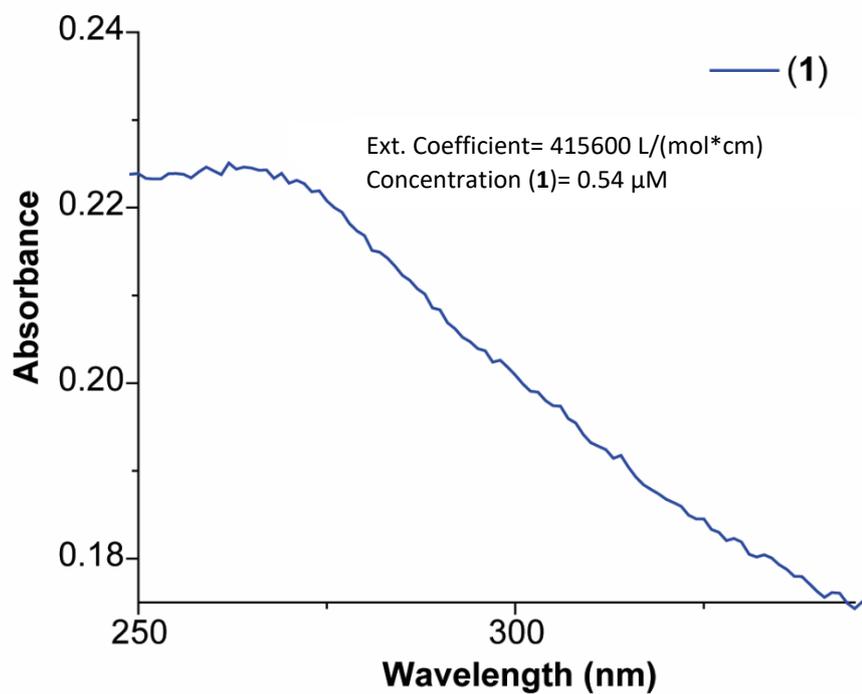


ESI Fig. 1 Raman spectrum of MoS₂-bulk showing the typical in-plane vibration mode (E_{2g}¹) at 383 cm⁻¹ and the out-of-plane mode (A_{1g}) among the S atoms at 408 cm⁻¹.

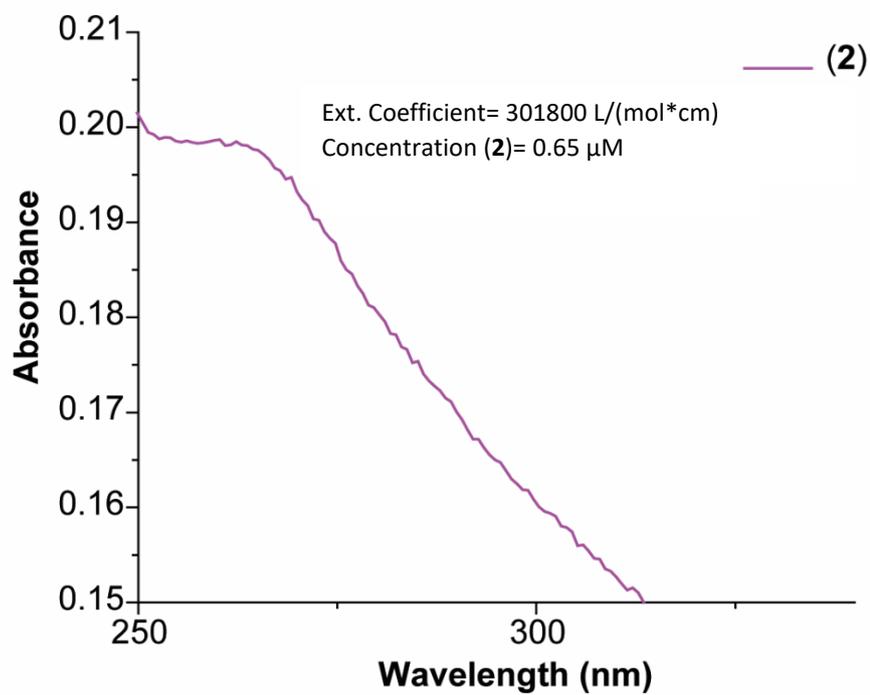


ESI Fig. 2 Schematic illustration of DNA functionalization on MoS₂-NS surface employing a thiolated-DNA strand.

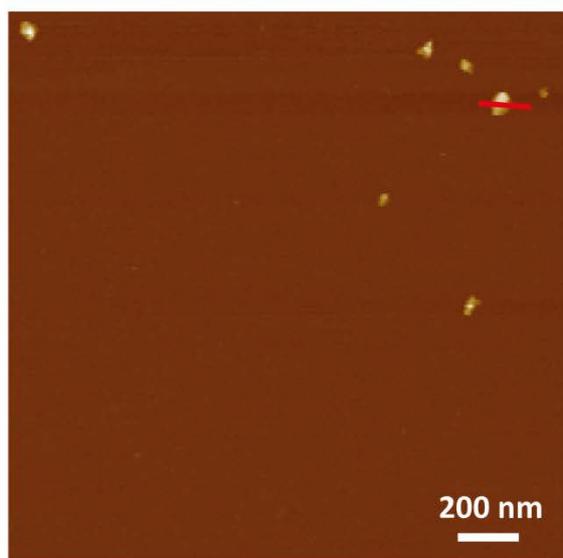
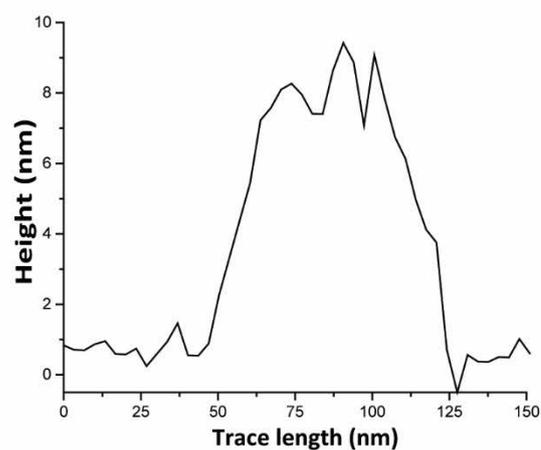
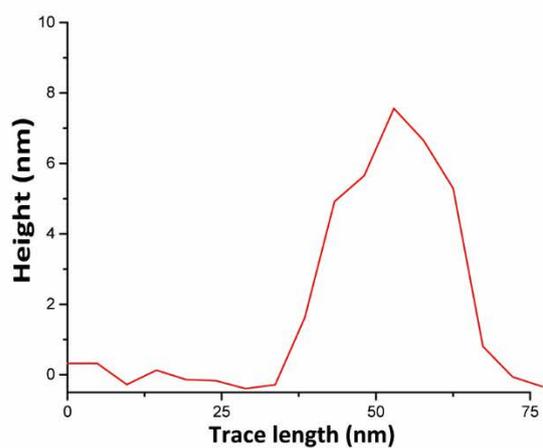
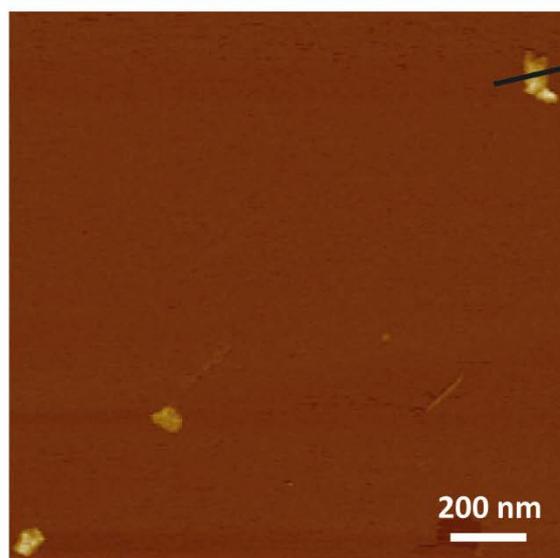
a)



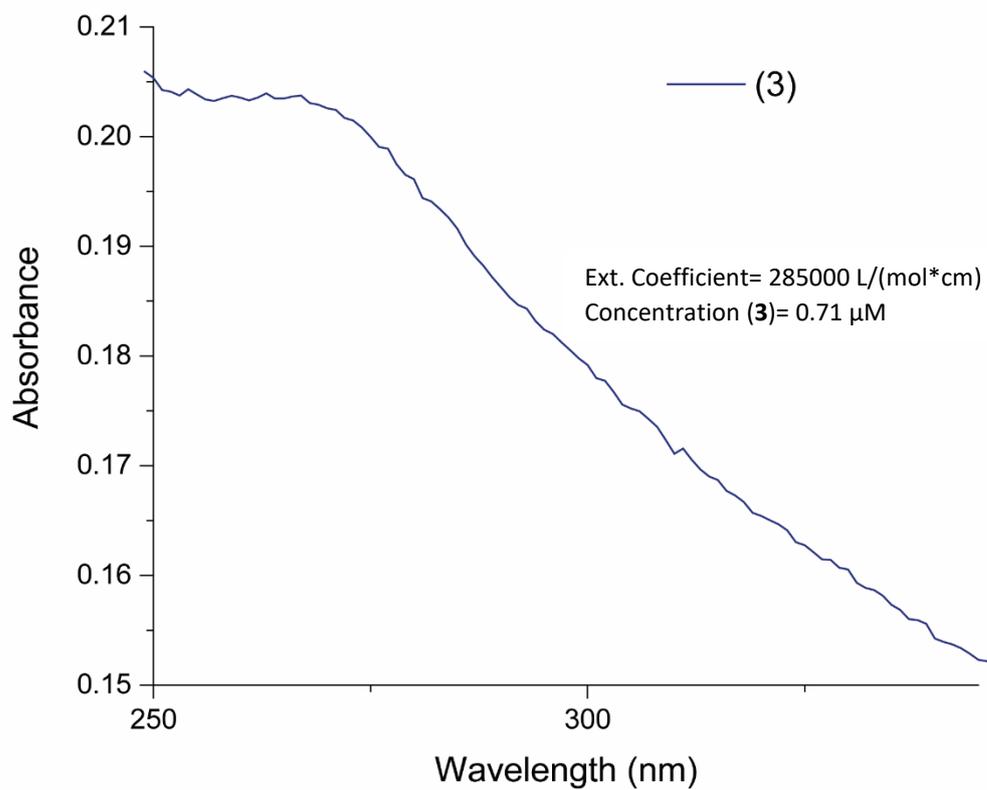
b)



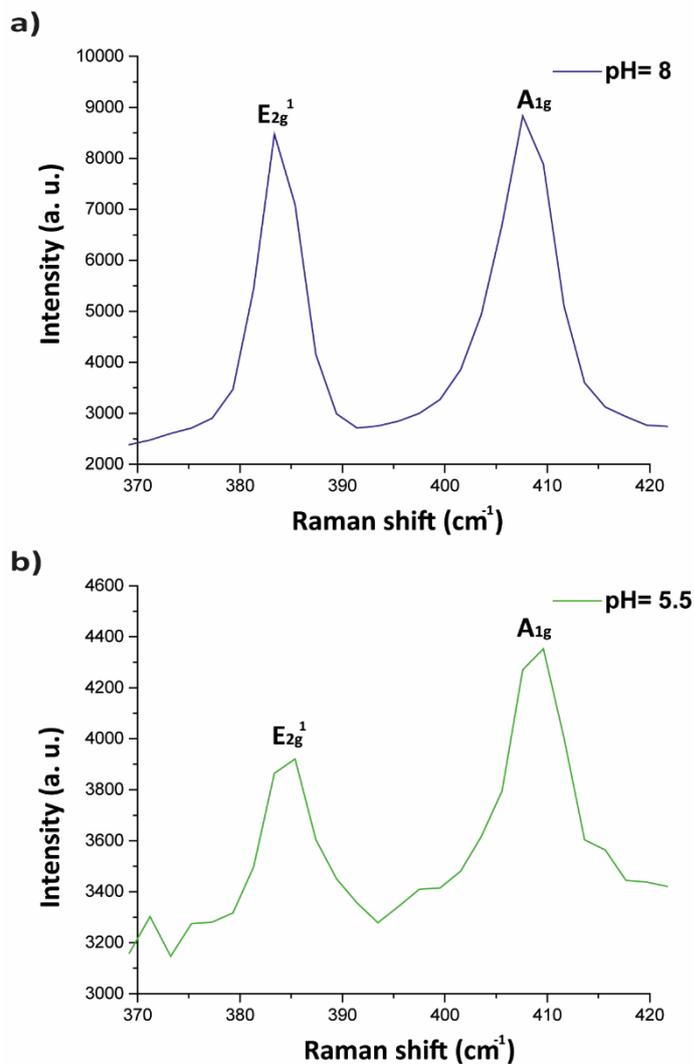
ESI Fig. 3 UV absorbance spectra of (a) thiolated (1) DNA sequence in M1. Calculated extinction coefficient: 415600 L/(mole*cm); Estimated concentration of (1) in M1: 0.54 μ M. (b) thiolated (2) DNA sequence in M2. Calculated extinction coefficient: 301800 L/(mole*cm); Estimated concentration of (2) in M2: 0.65 μ M.

a)**b)**

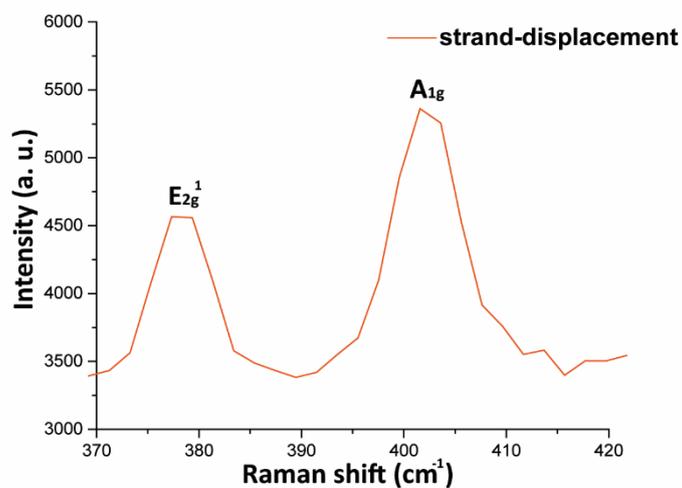
ESI Fig. 4 AFM topographical images and respective height profiles of: (a) a solution containing **M1** and **M3**, average MoS₂ nanosheets height = 7.5 ± 3.1 nm, and (b) a solution containing MoS₂-NS and amino-modified DNA strand (**2**), not capable of functionalizing MoS₂-NS, average MoS₂ nanosheets height: 7.9 ± 2.8 nm. In both samples, no evidence of assembly was observed.



ESI Fig. 5 UV absorbance spectrum of thiolated (3) DNA sequence in M3. Calculated extinction coefficient: 285000 L/(mole*cm), estimated concentration of (3) in M3= 0.71 μM.

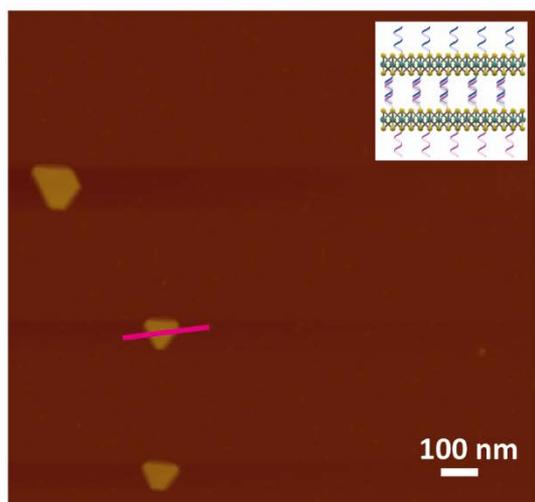


ESI Fig. 6 Raman spectra of an **M2/M3** solution (a) at pH= 8, showing $E_{2g}^1=383 \text{ cm}^{-1}$ and $A_{1g}=408 \text{ cm}^{-1}$; (b) at pH= 5.5, showing $E_{2g}^1=385 \text{ cm}^{-1}$ and $A_{1g}=410 \text{ cm}^{-1}$.

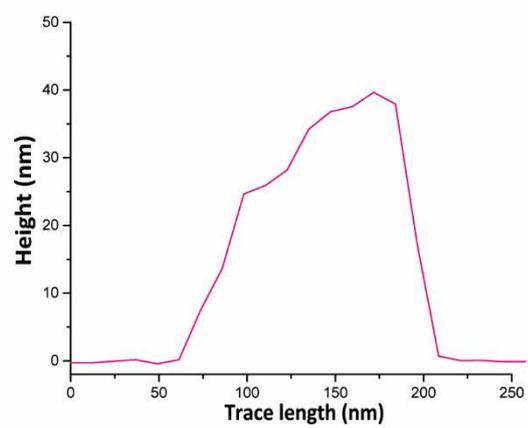


ESI Fig. 7 Raman spectrum of an **M2/M3** solution after addition of **(4)**, showing $E_{2g}^1=377 \text{ cm}^{-1}$ and $A_{1g}=402 \text{ cm}^{-1}$.

a)



b)



ESI Fig. 8 AFM topographical image and respective height profile of an M2/M3 solution after addition of DNA strand (I); average MoS₂ nanosheets height: 39.6 ± 13.5 nm. No evidence of disassembly was observed.