Electronic Supplementary Information (ESI)

Three dimensionally-ordered 2D MoS_2 vertical layers integrated on flexible substrates with stretch-tunable functionality and improved sensing capability

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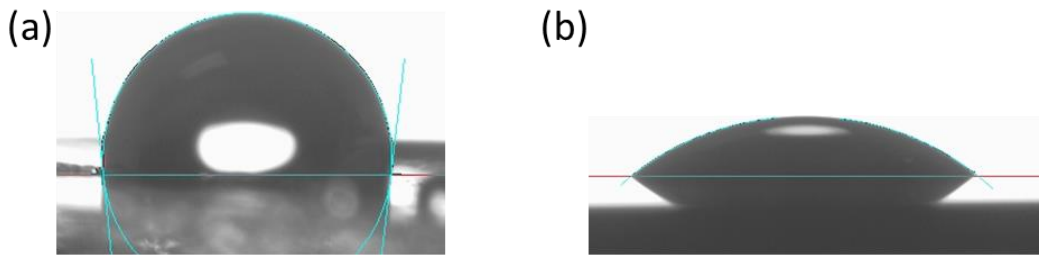

Figure S1. Water contact angle measurements of (a) 2D MoS_2 layers with vertically-algined layers, and (b) SiO_2 substrate revealing hydrophobicity and hydrophilicity, respectively.

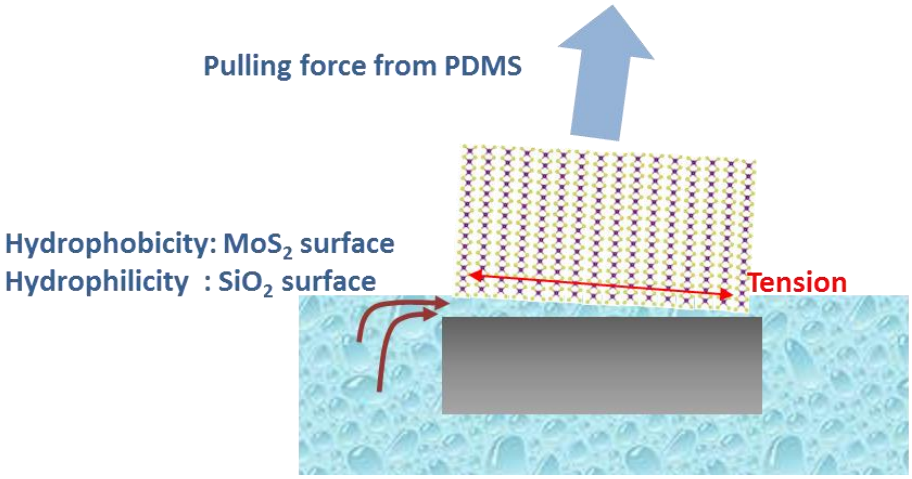

Figure S2. Schematic illustration to demonstrate the facile separation of vertically-aligned 2D layers assisted by the water wettability difference of SiO_2 vs. MoS_2 and the pullinf force exerted by PDMS.

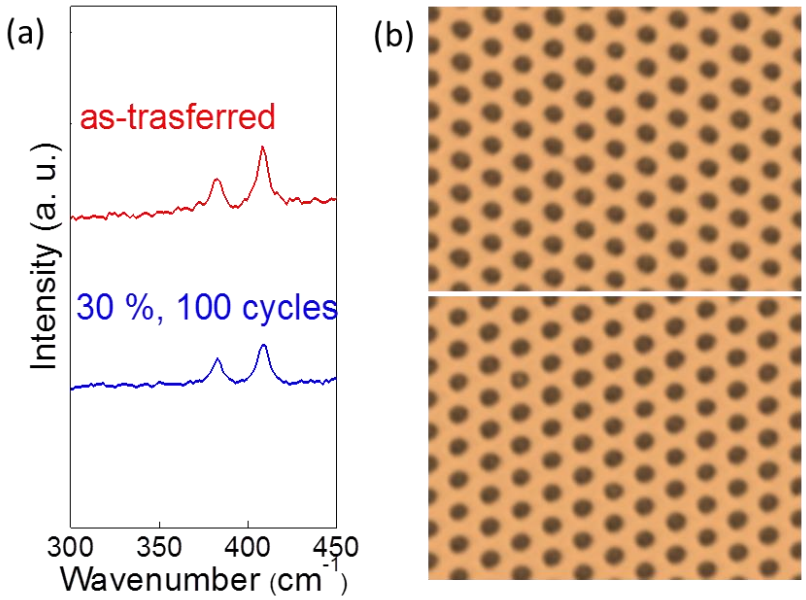

Figure S3. (a) Raman profiles of 2D vertical MoS_2 layers/PDMS before (red) and after (blue) repeated tensile stretch. (b) Optical microscopy images of the sample before (top) and after (bottom) tensile stratch.

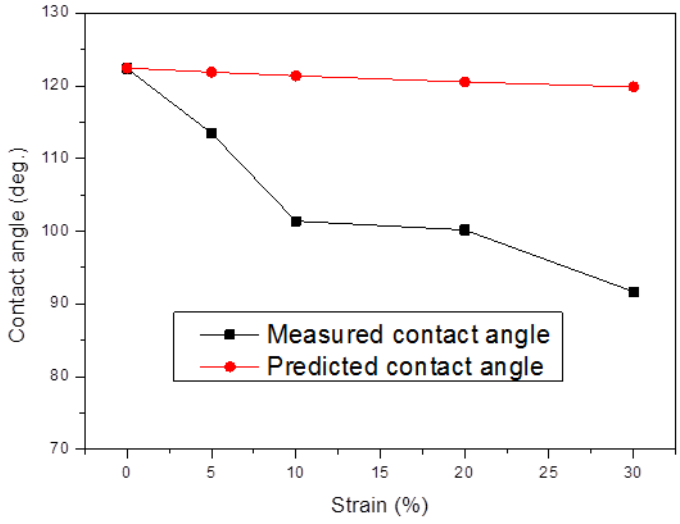

Figure S4. Comparison of water contact angle values obtained from experimental measurements (black dots) vs Wenzel equation prediction (red dots).

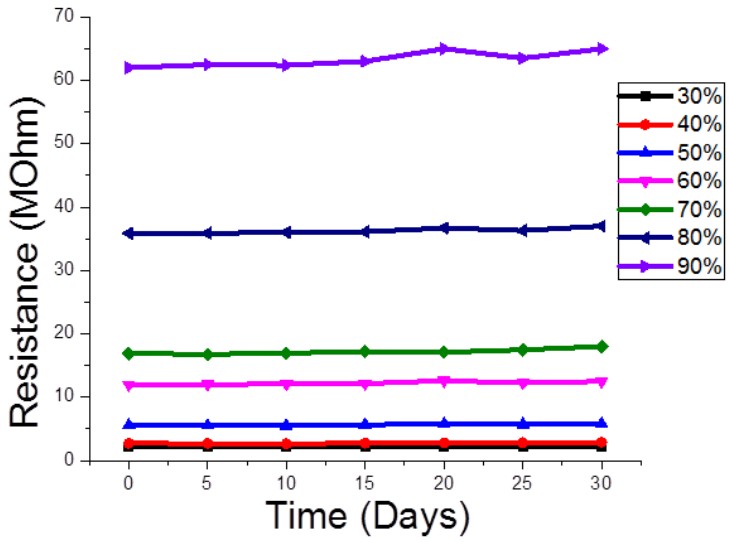

Figure S5. Long-term stability of vertically-aligned 2D MoS_2 layers for humidity sensing.