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 pulling 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 stretch.

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.