General, Vertical, Three-Dimensional Printing of Two-Dimensional Materials with Multiscale Alignment

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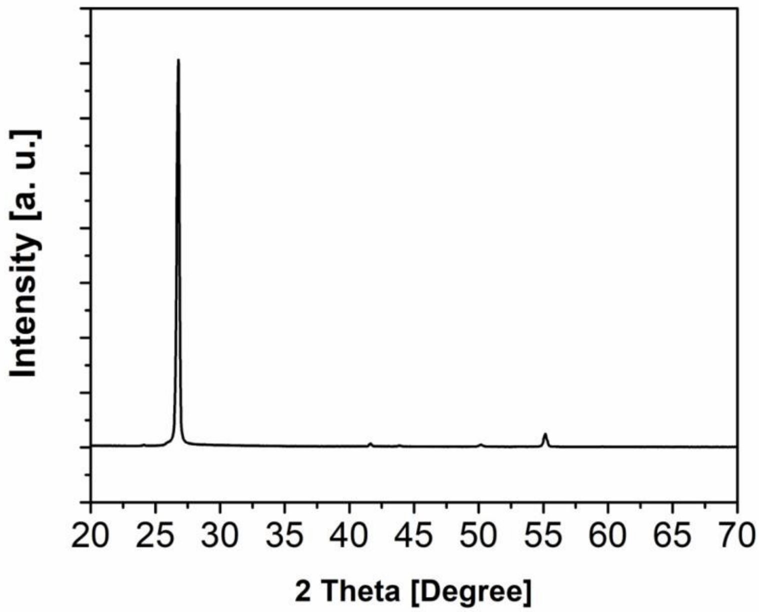

Figure S1. The X-ray diffraction pattern of 2D BN nanosheets.

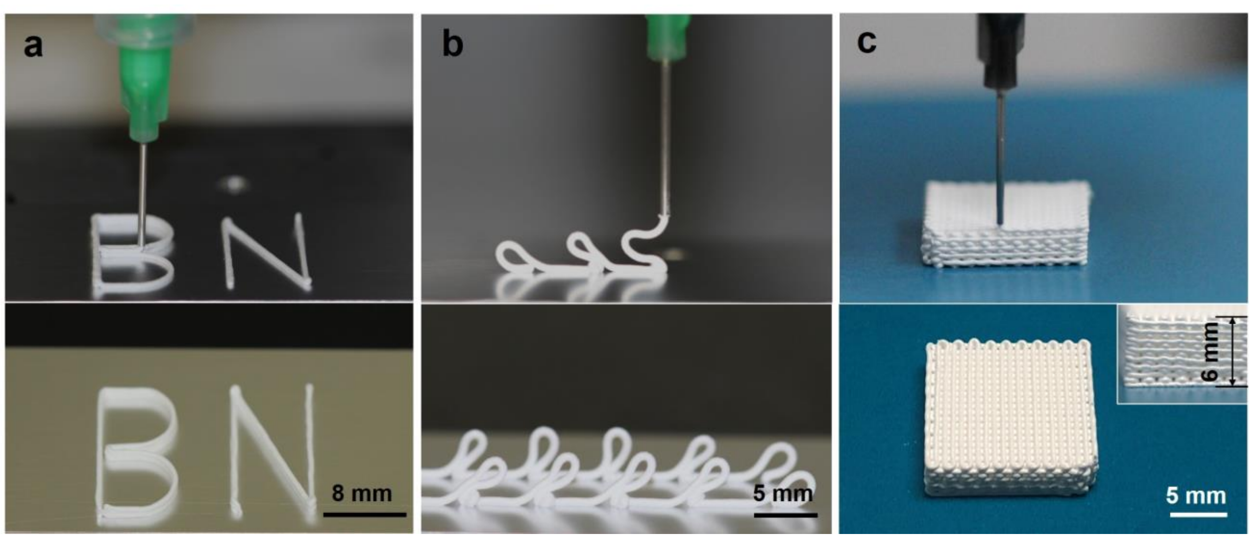

Figure S2. 3D printed BN structures. Optical images of the structures being printed (top) and the resulting (bottom) structures, including (a) 3D letters ("B" and "N"), (b) loops, and (c) a scaffold featuring 16 layers.

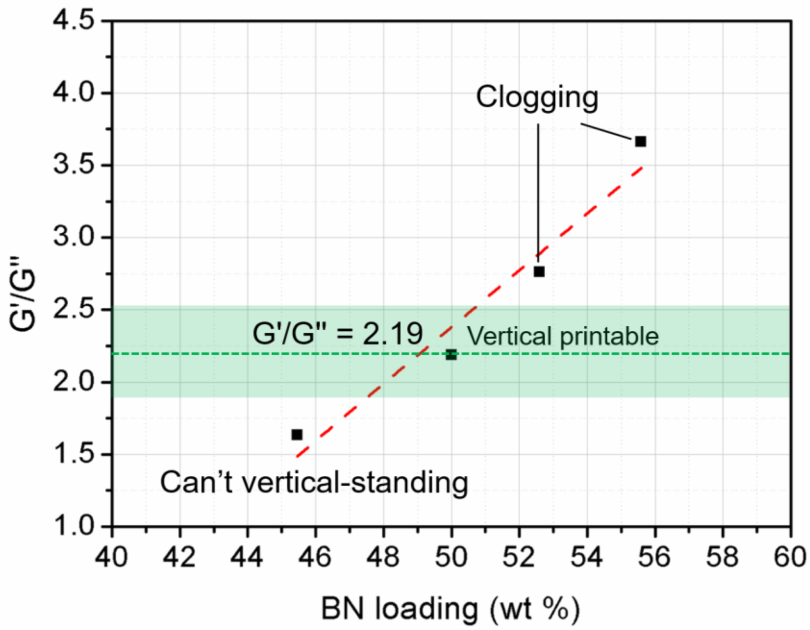

Figure S3. The ratio of storage to loss modulus of BN inks as a function of BN loading.

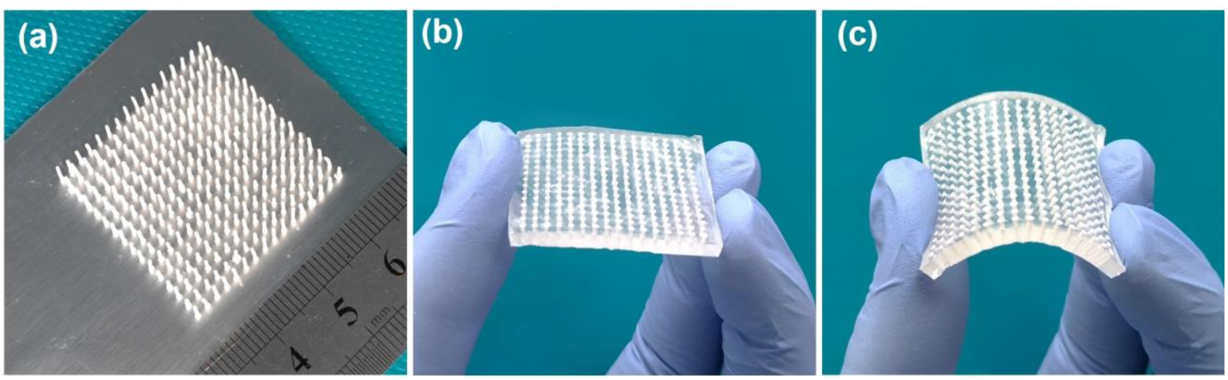

Figure S4. (a) Optical image of a 3D vertically printed BN array with sixteen-by-sixteen BN rods. Optical images of the flexible BN-array/PDMS in (b) flat and (c) bent conditions.

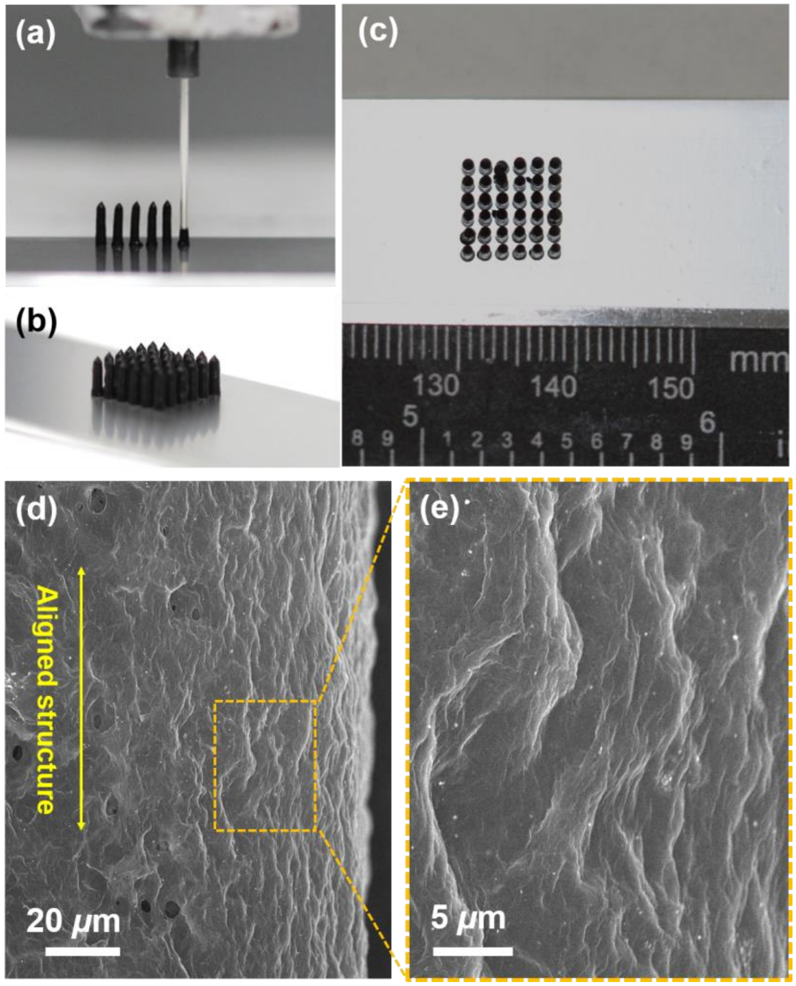

Figure S5. Vertical printing of reduced graphene oxide (RGO) rod array. (a) Optical images showing the vertical printing of RGO rods. Optical images of the side (b) and top (c) views of the as-printed RGO array, featuring six-by-six RGO rods. (d) and (e) are SEM images of the surface morphology of an RGO rod.

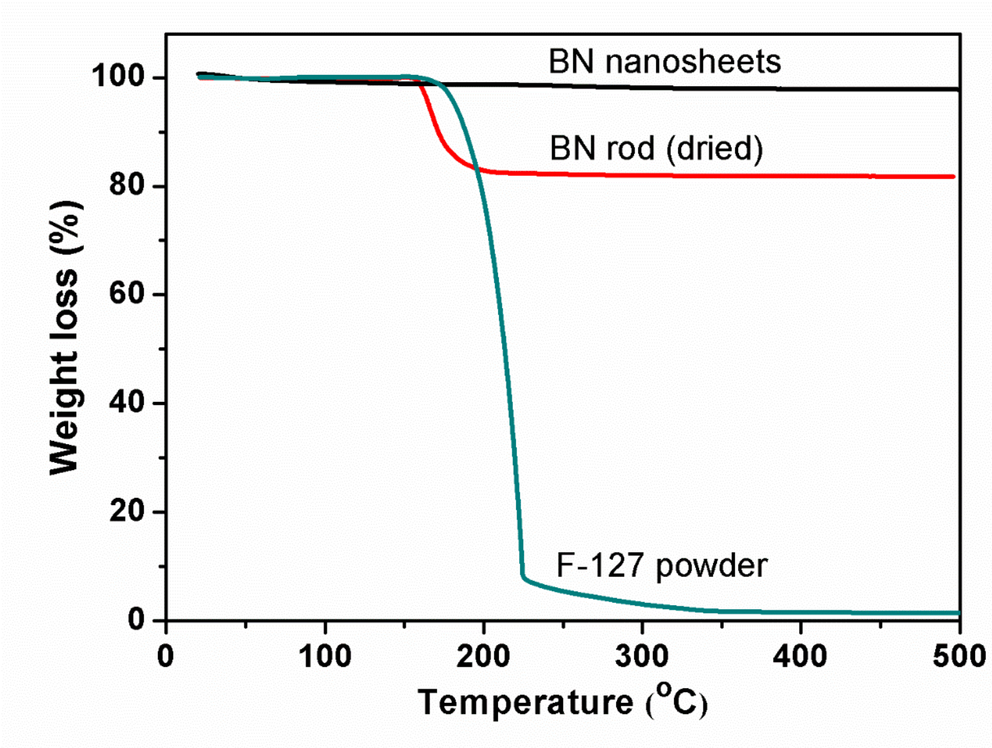

Figure S6. The TGA curves of BN nanosheets, raw F-127 powder, and the dried BN rods printed from the ink with a BN loading of 50 wt%. The curves were recorded in air atmosphere with a heating rate of 5 °C/min.

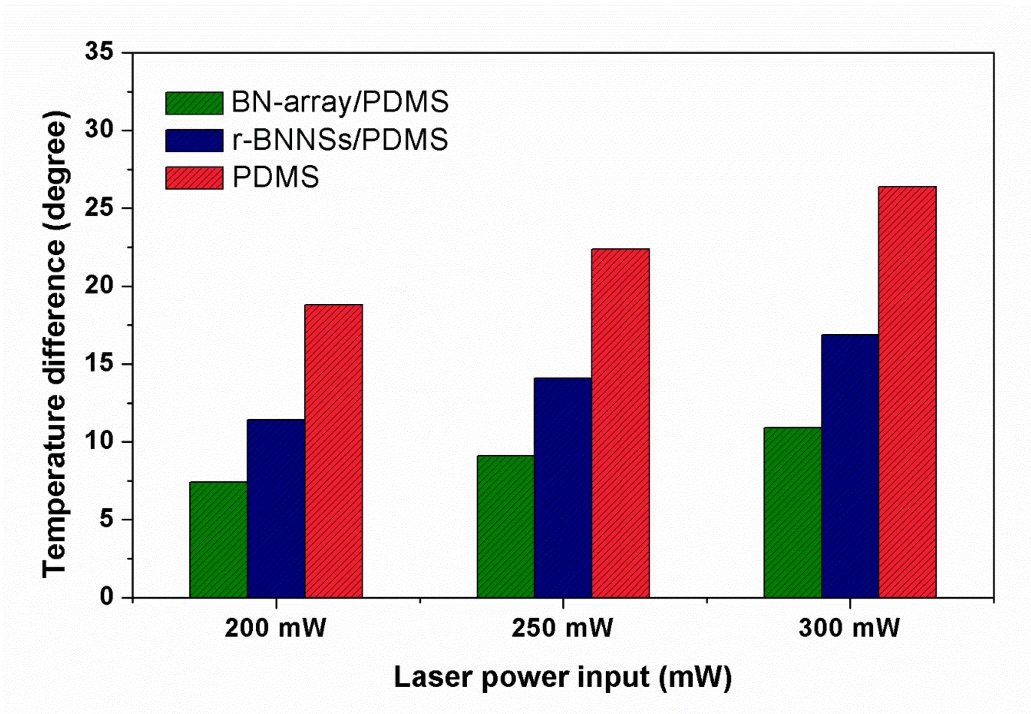

Figure S7. Temperature difference between the top and bottom surfaces of the BN-array/PDMS (green), r-BNNSs/PDMS (blue), and PDMS (red) matrixes under different laser power input.