Electronic supplementary information

3D Printing of Highly Conductive Silver Architectures Enabled to Sinter at Low Temperatures

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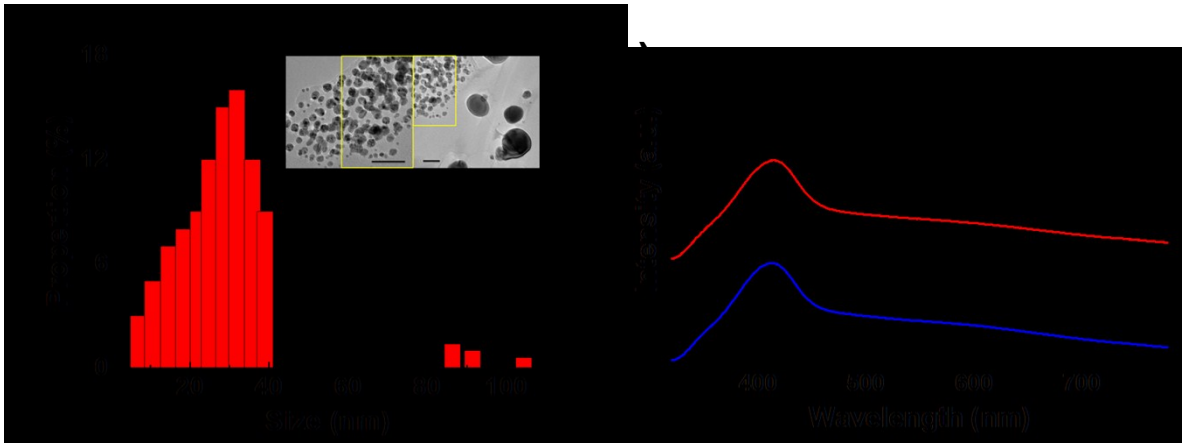

Fig. S1. (a) TEM image and the corresponding size distribution of synthesized PAA-AgNPs. The size distribution of AgNPs was obtained by measuring the diameter of more than 150 particles. Inset is corresponding TEM images of PAA-AgNPs. (Scale bar is 100 nm). (b) UV-vis absorption spectra of PAA-AgNPs synthesized separately.

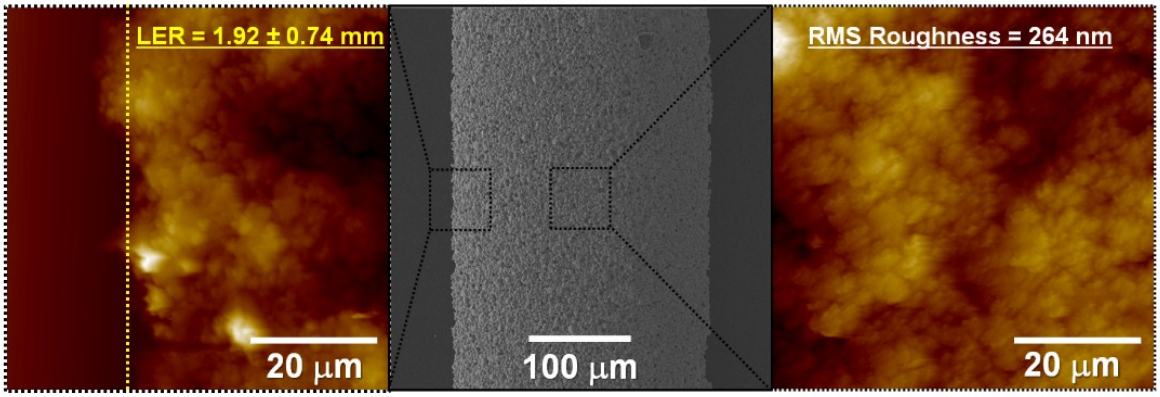

Fig. S2. FE-SEM and AFM analysis for printed Ag lines with a width (W_p) of 250 μm. Line edge roughness (LER) and RMS roughness of surface are 1.92±0.74 μm and 264 nm, respectively.

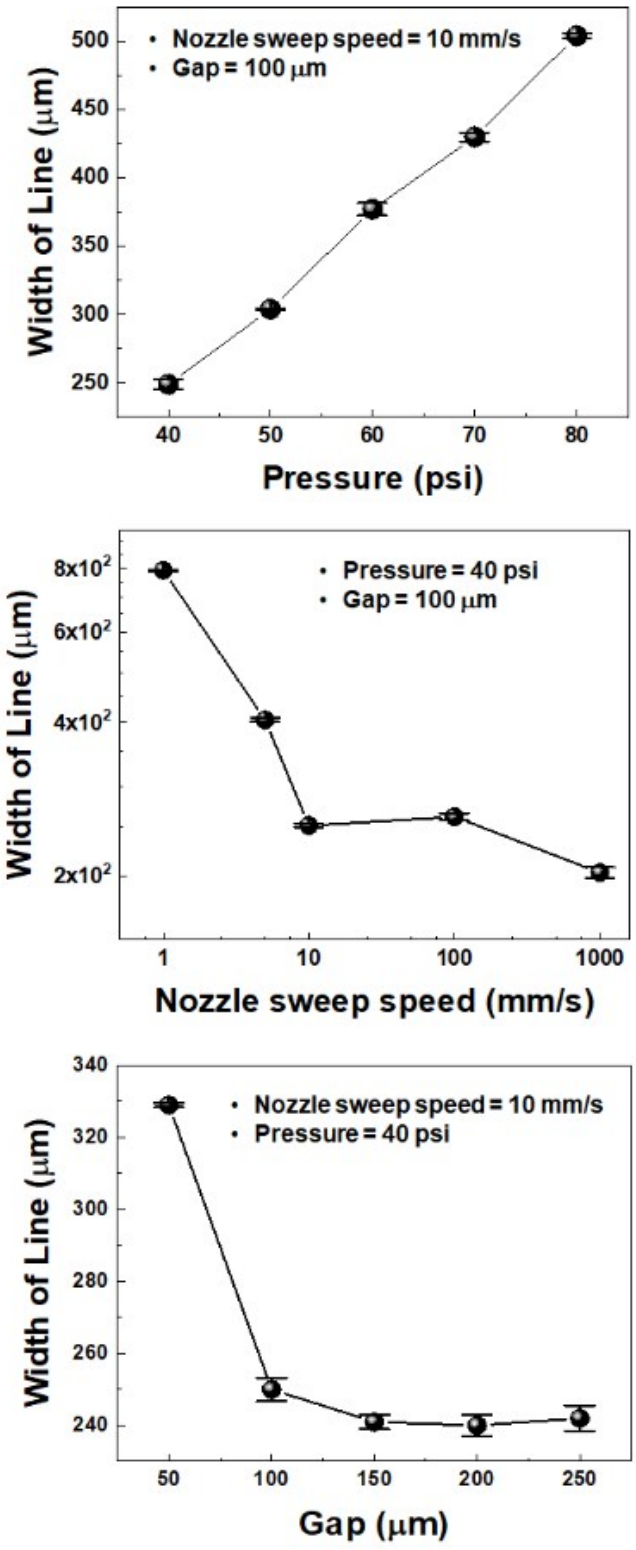

Fig. S3. The printed line width as functions of (a) the applied pressure, (b) the nozzle sweep speed, and (c) the gap between nozzle and substrate (inner diameter (D_n) = 200 μm).

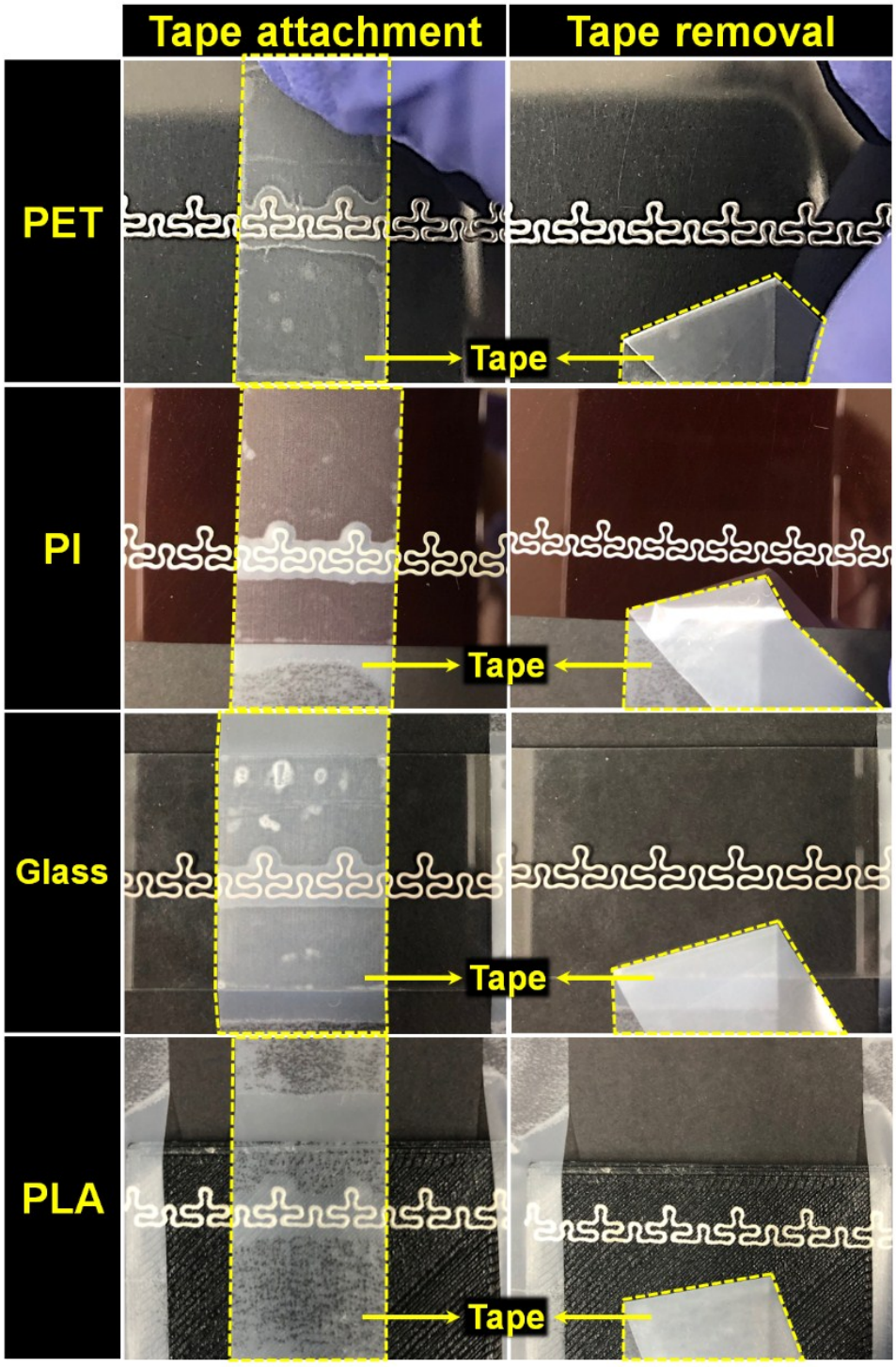

Fig. S4. Tape-test to verify the adhesion of the Ag 2D pattern to different substrates with hydrophilic surface (PET, PI, PLA, and glass).

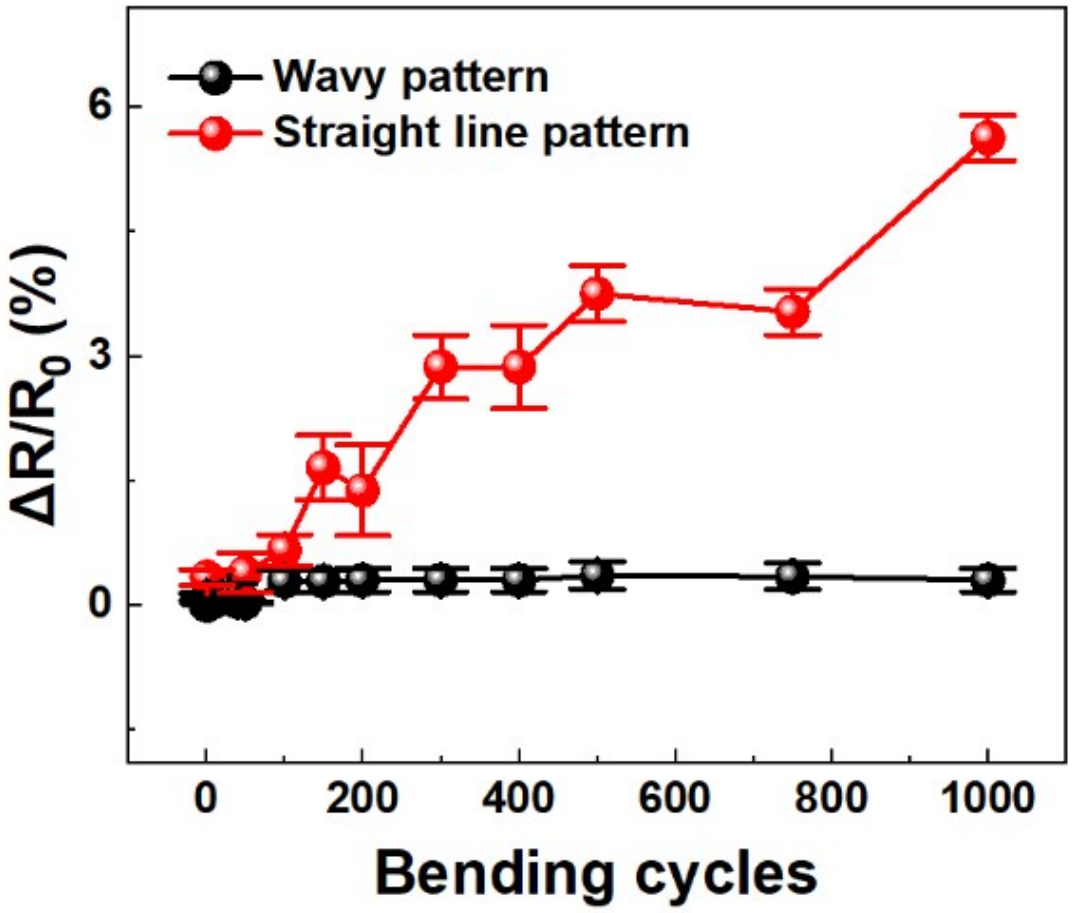

Fig. S5. The relative resistance change of wavy (within 0.5%) and straight (~ 5.6%) patterns with W_p of 250 μm after 1,000 times of bending at a curvature radius of 8 mm.

Video 1: Printing of conductive Ag grid on polyimide (PI) substrate (AVI)

Video 2: Flexible behavior of conductive Ag grid on polyimide (PI) substrate (AVI)

Video 3: Printing of nonlinear and arbitrary Ag pattern, “Bird” (AVI)

Video 4: 3D printing of Ag wavy structure (AVI)

Video 5: Printing of Ag wavy pattern on PET substrate (AVI)

Video 6: Tape-test to verify the adhesion of the Ag pattern to the PET substrate (AVI)

Video 7: Bending test of printed Ag pattern (AVI)

Video 8: Operation of Ag circuit at bending and twisting (AVI)

Video 9: Operation of blinking device with 3D bridge-type interconnect (AVI)