Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.
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Supplementary Information

Reactive Inkjet Printing of Graphene Based Flexible Circuits and Radio Frequency Antennas

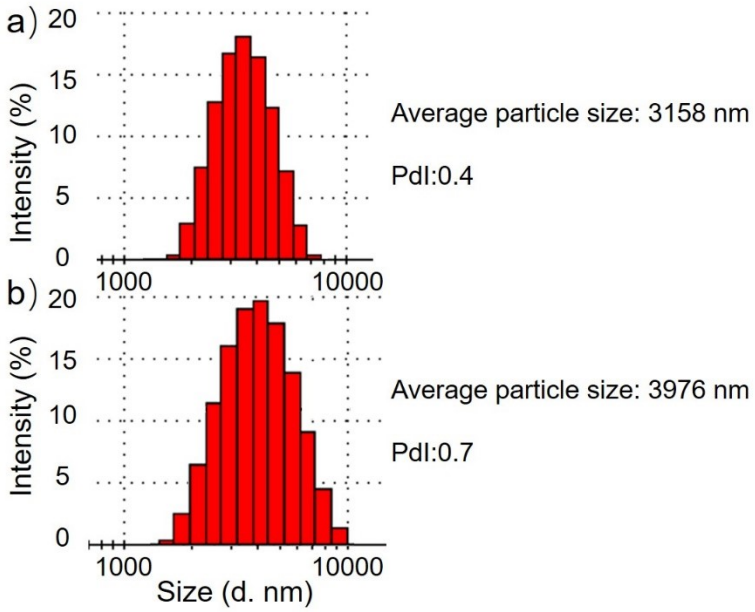
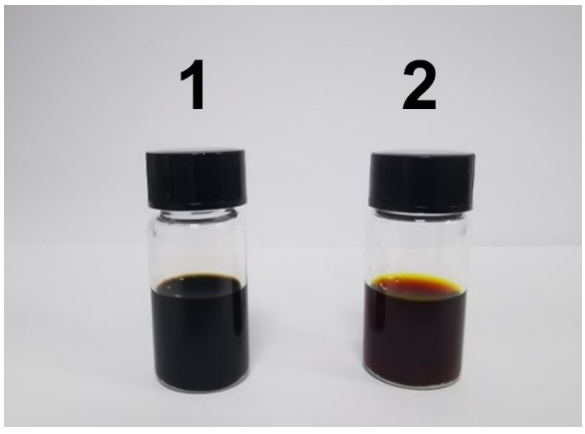


Figure S1. The particle size after 3 months of storage reveals a 25+% change in mean particle size measured by DLS. **a**) fresh GO; **b**) GO after 3-month storage.



#	Chemicals	Viscosity (cP)	Surface tension (mN/m)
1	GO	13.5	58.474
2	hydroiodic acid	2.83	76.854

Figure S2. A photograph of the prepared inks (Left:GO ink; Right: HI ink) with their viscosity values and surface tension values in the table.

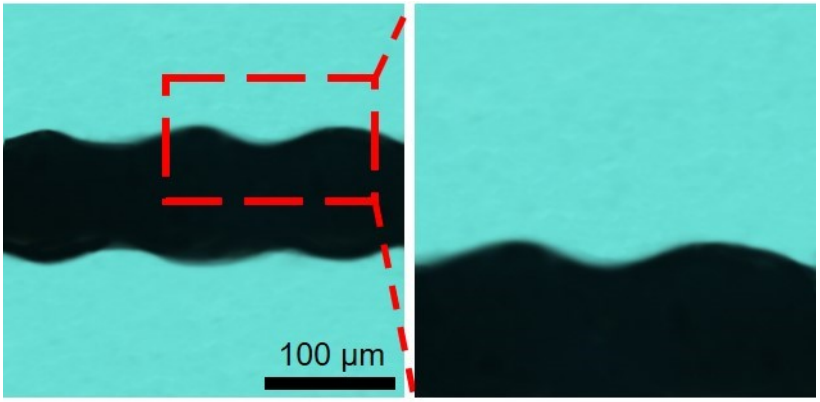


Figure S3. **a**) Printed rGO lines (0.1 mm). **b**) The magnified image of the red box area.

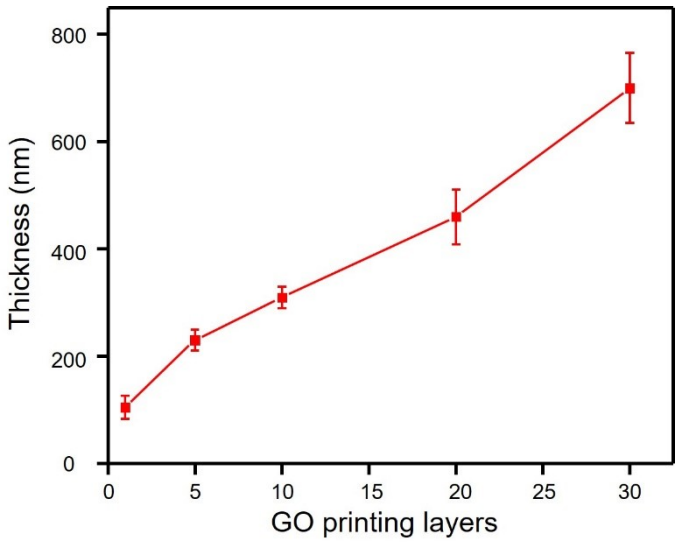


Figure S4. The thickness of different GO printed layers on a glass substrate measured using a step profiler (error bars represent standard deviations, n = 3.)

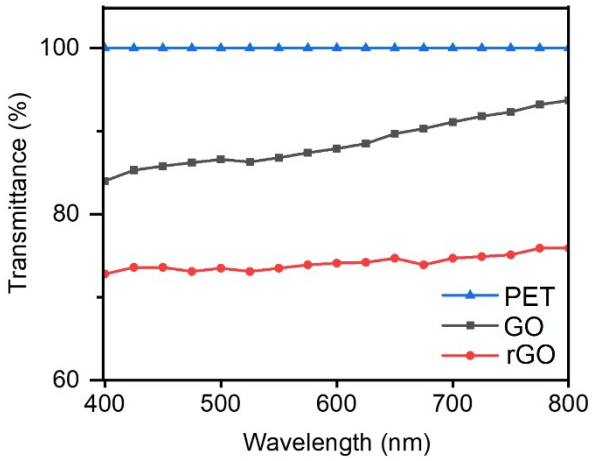


Figure S5. The transmittance of pure PET, GO films on PET and rGO films on PET.

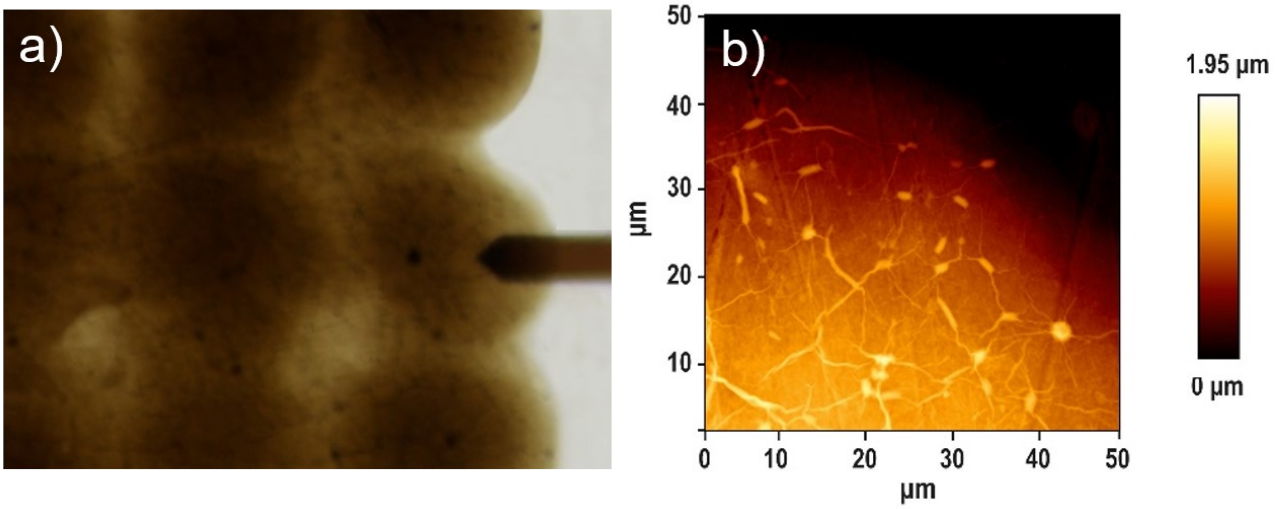


Figure S6. a) An optical micrograph of GO printed samples under the AFM microscope. **b**) Topography of the edge of a circular droplet under AFM scanning.

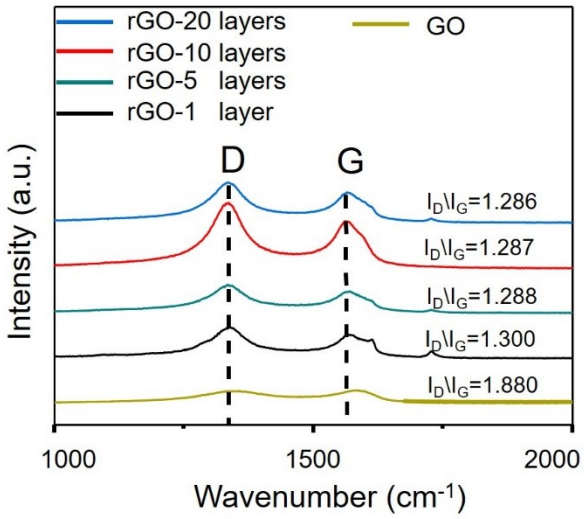


Figure S7. Raman spectra of rGO with different layers and corresponding I_D/I_G values.

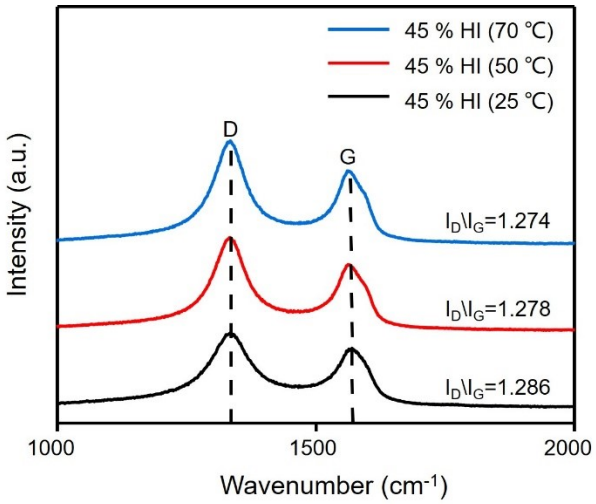


Figure S8. Raman spectra of rGO with different temperatures of the substrate and corresponding I_D/I_G values.

Table S1. The apparent crystallite size in the c direction (Lc) obtained by XRD; integrated intensity ratio of the D and G bands (I_D/I_G) and apparent in-plane crystallite size (La) by raman; electrical conductivity of the rGO.

rGO Samples	I_D/I_G	L_a (nm)	2θ (°)	FWHM	L_c (nm)	Conductivity ($S.m^{-1}$)
20 layers	1.286	3.421	25.68	1.284	6.359	1.72×10^4
30 layers	1.285	3.424	26.31	0.908	10.41	2.35×10^4

The apparent in-plane crystallite size (La)

$$L_a = \frac{4.4}{(\frac{I_D}{I_G})} \ (nm)$$

The apparent crystallite size in the c direction (Lc)

$$L_c = \frac{K\gamma}{B\cos\theta}$$

Where K, γ, B, θ are scherrer constant, x-ray wavelength (generally 1.54056Å), diffraction full width at half peak (FWHM), bragg diffraction angle.

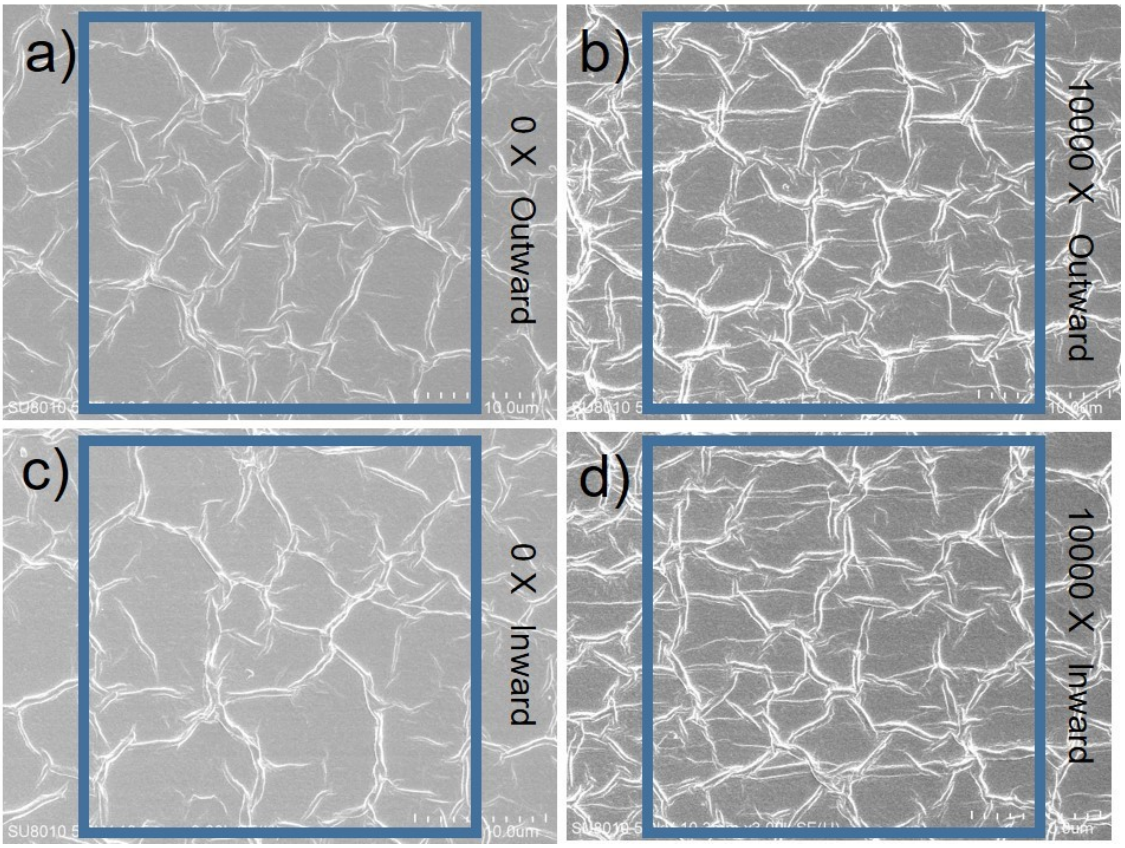


Figure S9. SEM images of the morphology of the printed 20 layers rGO lines before and after 10000 cycles of inward and outward bending.

Table S2. The crease density and crease width of the printed 20 layers rGO lines before and after 10000 cycles of inward and outward bending.

Sample	Crease width (μm)	Crease density (900 μm²)
Before 10000 cycles of outward bending	0.617 ± 0.196	61
After 10000 cycles of outward bending	0.636 ± 0.149	68
Before 10000		

cycles of inward bending	0.583 ± 0.137	43
After 10000 cycles of inward bending	0.611 ± 0.199	67

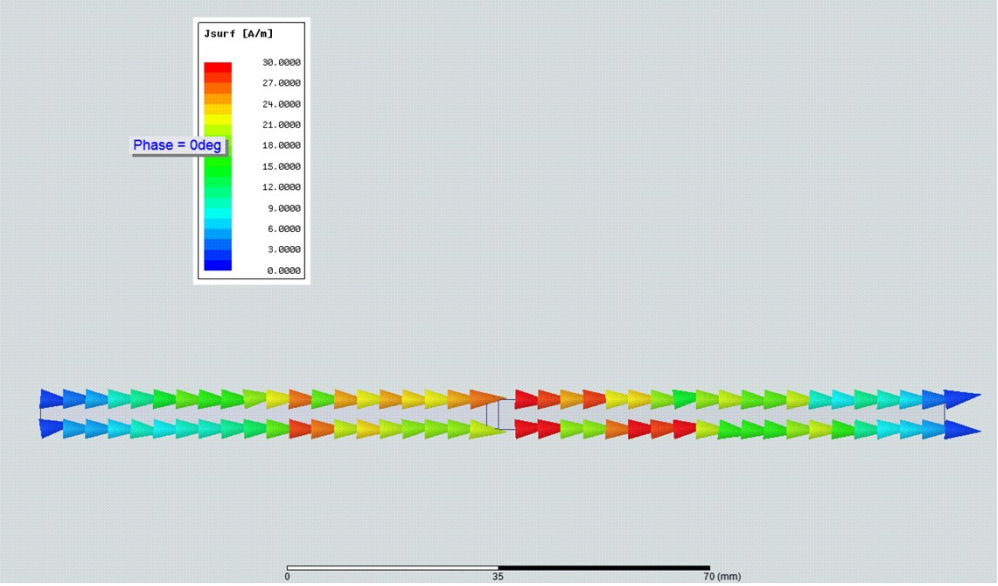


Figure S10. The current distributions of the proposed antenna. The current distributions are calculated by a commercial software ANAYS HFSS 18.0 which solves Maxwell's equations by the finite element method. The results reveal that the current flows along the x-axis.