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Supporting information

Highly conductive and environmentally stable gold/graphene yarns for flexible and wearable electronics

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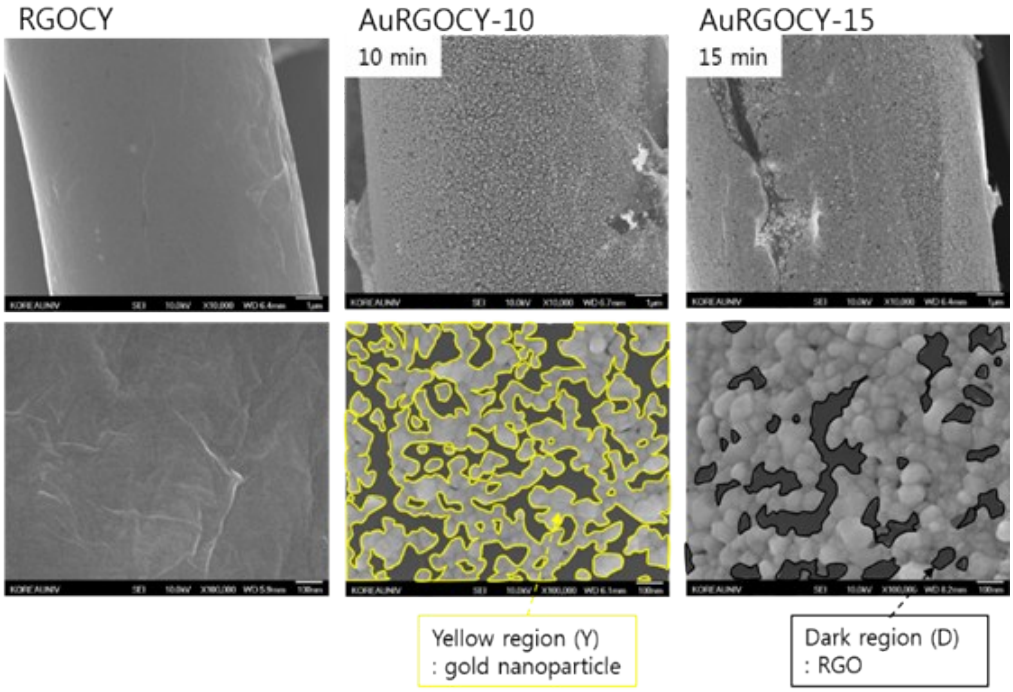


Samples	T	Y	D	Surface coverage (%)
RGOCY	1175000 nm^2	0	1175000 nm^2	0 %
AuRGOCY-10		705000 ± 70500 nm^2	470000 ± 70500 nm^2	60 ± 6 %
AuRGOCY-15		998750 ± 47000 nm^2	176250 ± 47000 nm^2	85 ± 4 %

Surface coverage of gold nanoparticle on RGO (%) = [(T - D) / T] * 100 (%)

T (Total area) = 1175000 nm^2

Y (yellow region: gold nanoparticle)

D (dark region: RGO) = T - Y

Figure S1. Surface coverage analysis of gold nanoparticle for RGOCY, AuRGOCY-10, and AuRGOCY-15.

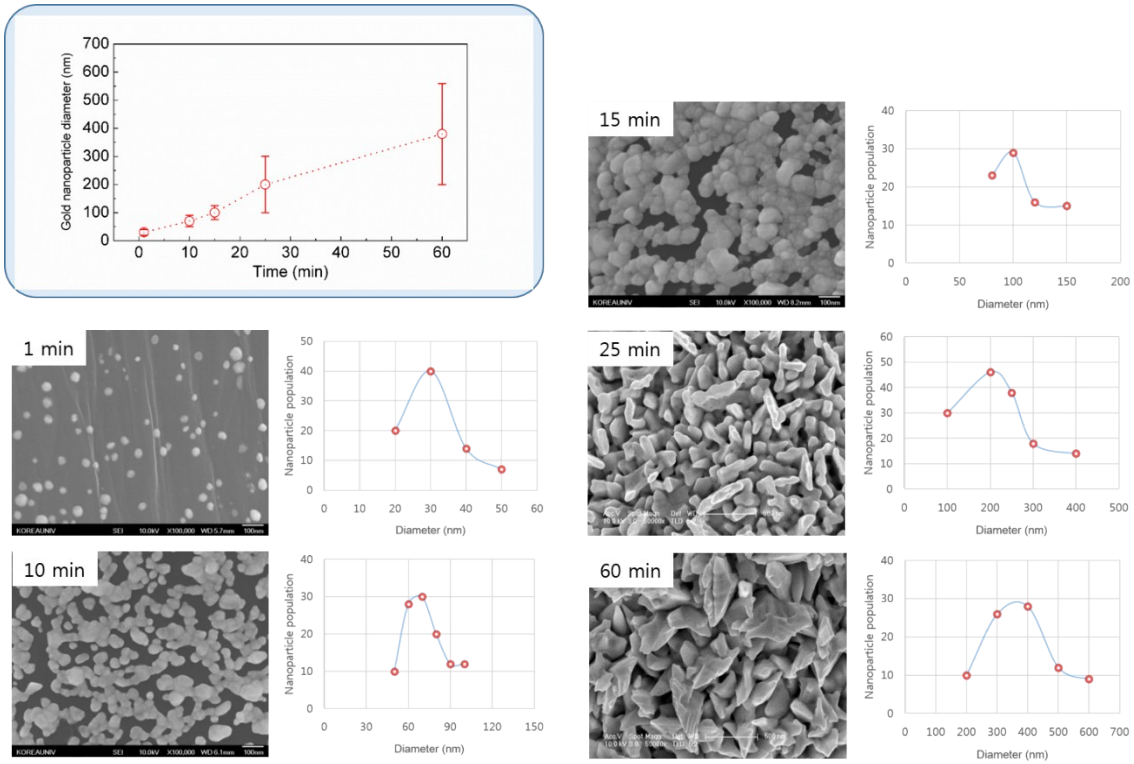


Figure S2. Average diameter of gold nanoparticles as a function of deposition time.

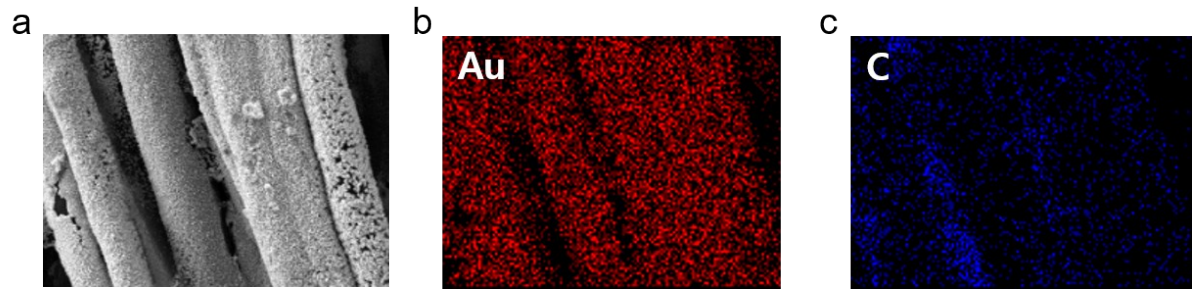


Figure S3. a, b, c, FESEM image and EDS spectra of the AuRGOCY-60.

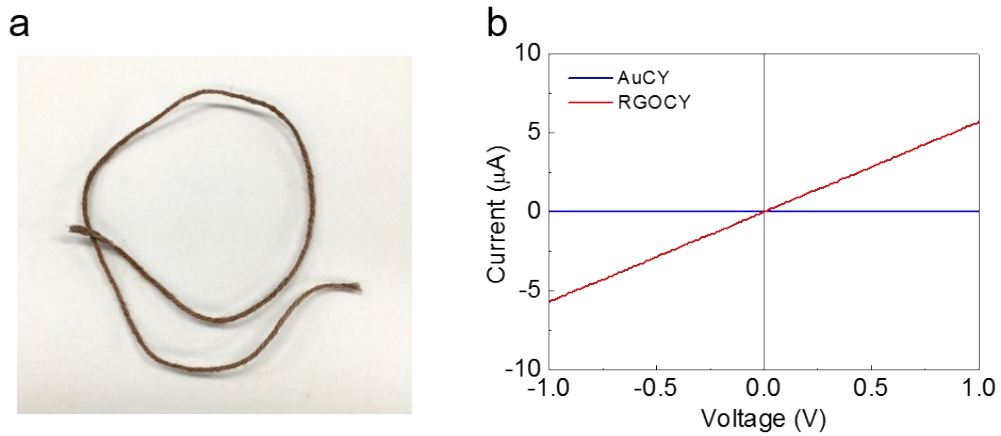


Figure S4. a, Photoimage of AuCY. b, I-V curves of AuCY and RGOCY measured by four-probe method.

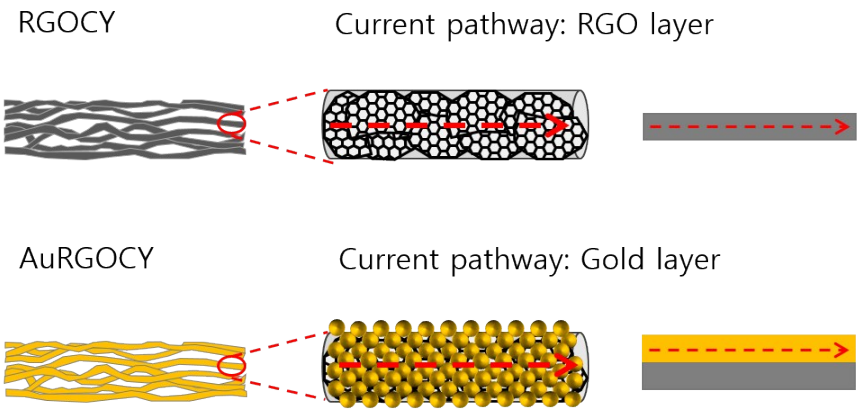
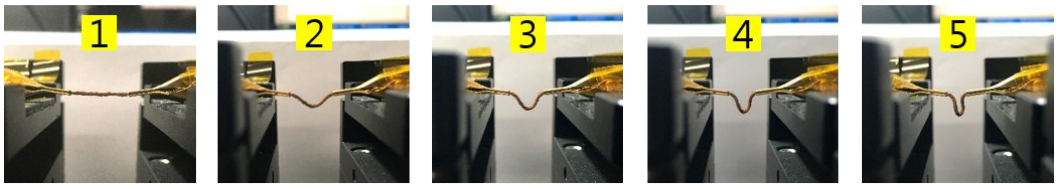


Figure S5. Current pathways in RGOCY and AuRGOCY-60.



Position	Bending angles (θ)
1	0°
2	80°
3	120°
4	145°
5	170°

Figure S6. Photoimages of gold/graphene yarns during bending test.

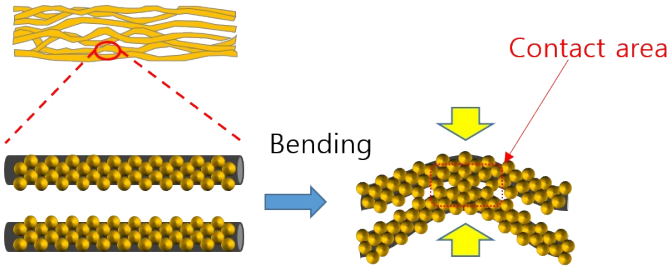


Figure S7. Schematic illustration of the AuRGOCY under bending process.

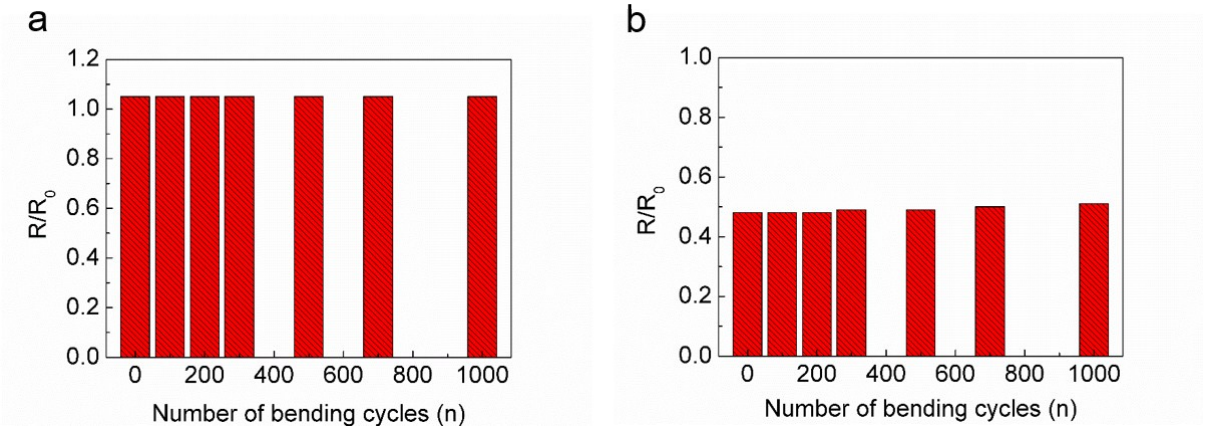


Figure S8. a, b, Mechanical durability test results of RGOCY and AuRGOCY-60 under repeated bending-releasing (1000 cycles).

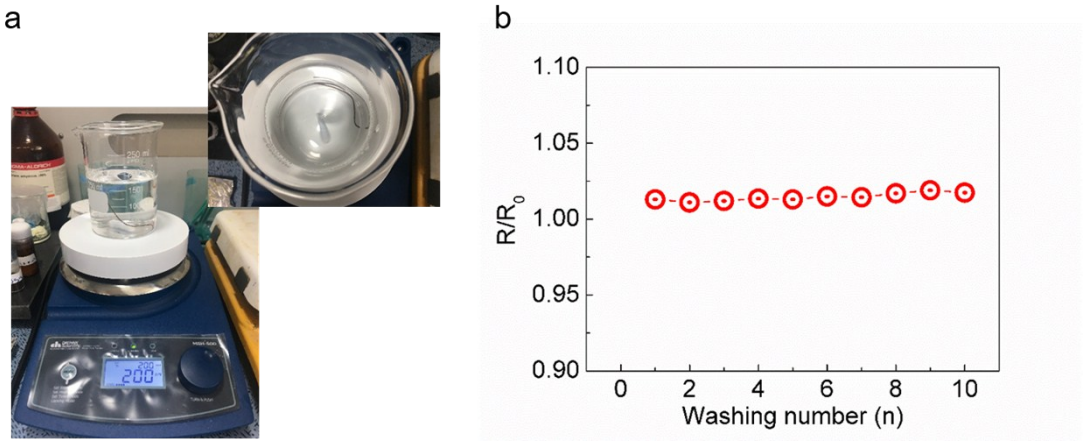


Figure S9. a, Photoimage of gold/graphene yarn during washing test. b, Variation of electrical resistance as a function of washing number.

Figure S10. Photoimages of various RGO soft substrates. a, RGO/cotton fabric. b, RGO/PET film. c, RGO/PDMS.

Table S1. Sheet resistance of various graphene films and gold/graphene films.

Samples	Sheet resistance (Ω/sq)
RGO cotton fabric	2500 ± 700
Gold/RGO cotton fabric	1.0 ± 5.0
RGO PET film	800 ± 300
Gold/RGO PET film	0.15 ± 0.05
RGO PDMS film	1000 ± 500
Gold/RGO PDMS film	0.35 ± 0.1