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Electronic Supplementary Information

Facile conversion of a cellulose acetate laminate film to graphene by a lamination process and post-annealing

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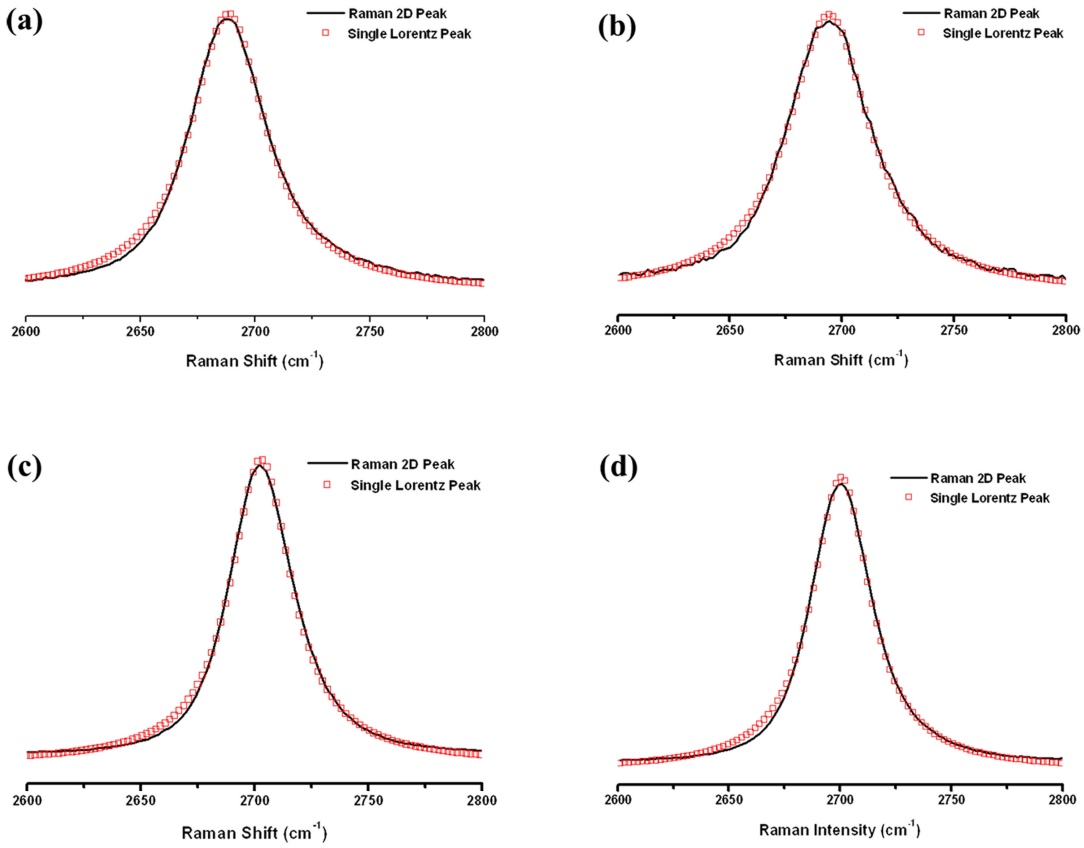

Figure S1. Fitted Raman spectra of monolayer graphene samples annealed at 800 ^{o}C (a), 850 ^{o}C (b), 900 ^{o}C (c), and 950 ^{o}C (d). Raman 2D peak of monolayer graphene was fitted with a single Lorentzian curve. Solid lines are the original data. Square points are the fitting curves.

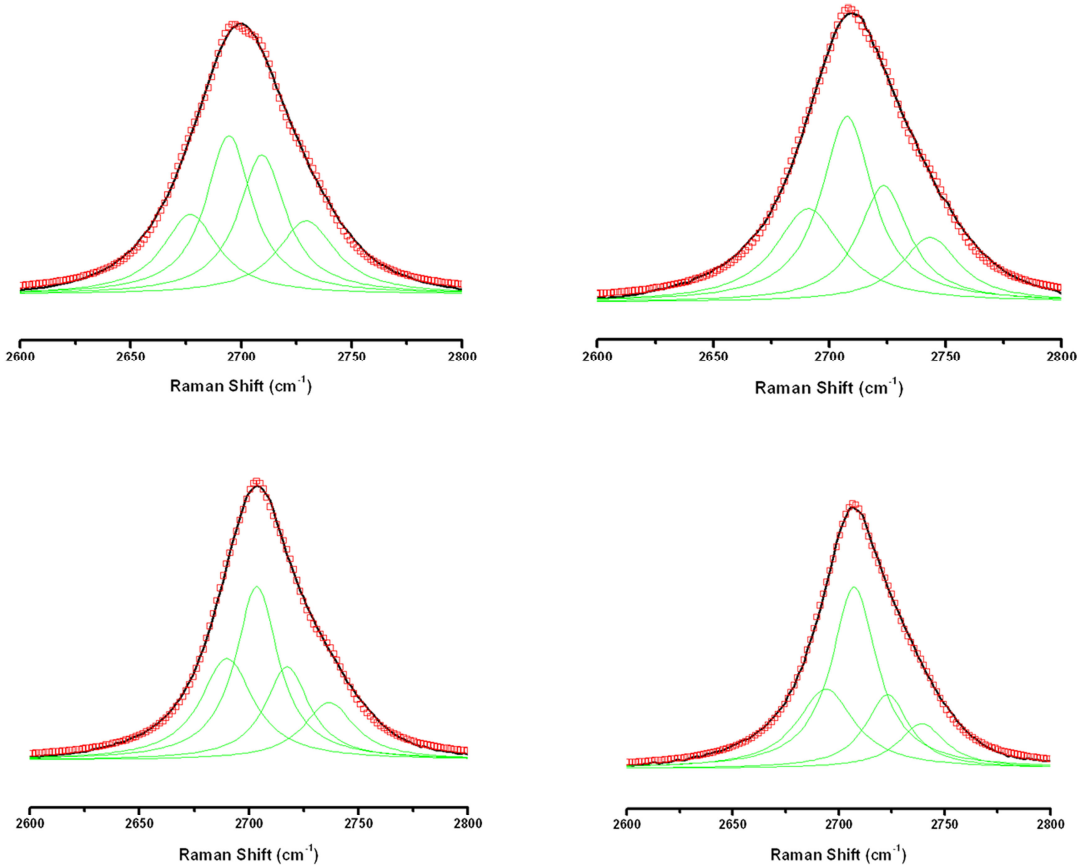

Figure S2 Fitted Raman spectra of bilayer graphene samples annealed at 800 ^{o}C (a), 850 ^{o}C (b), 900 ^{o}C (c), and 950 ^{o}C (d). Raman 2D peak of bilayer graphene was split into 4 peaks. Solid lines are the original data. Square points are the fitting curves.

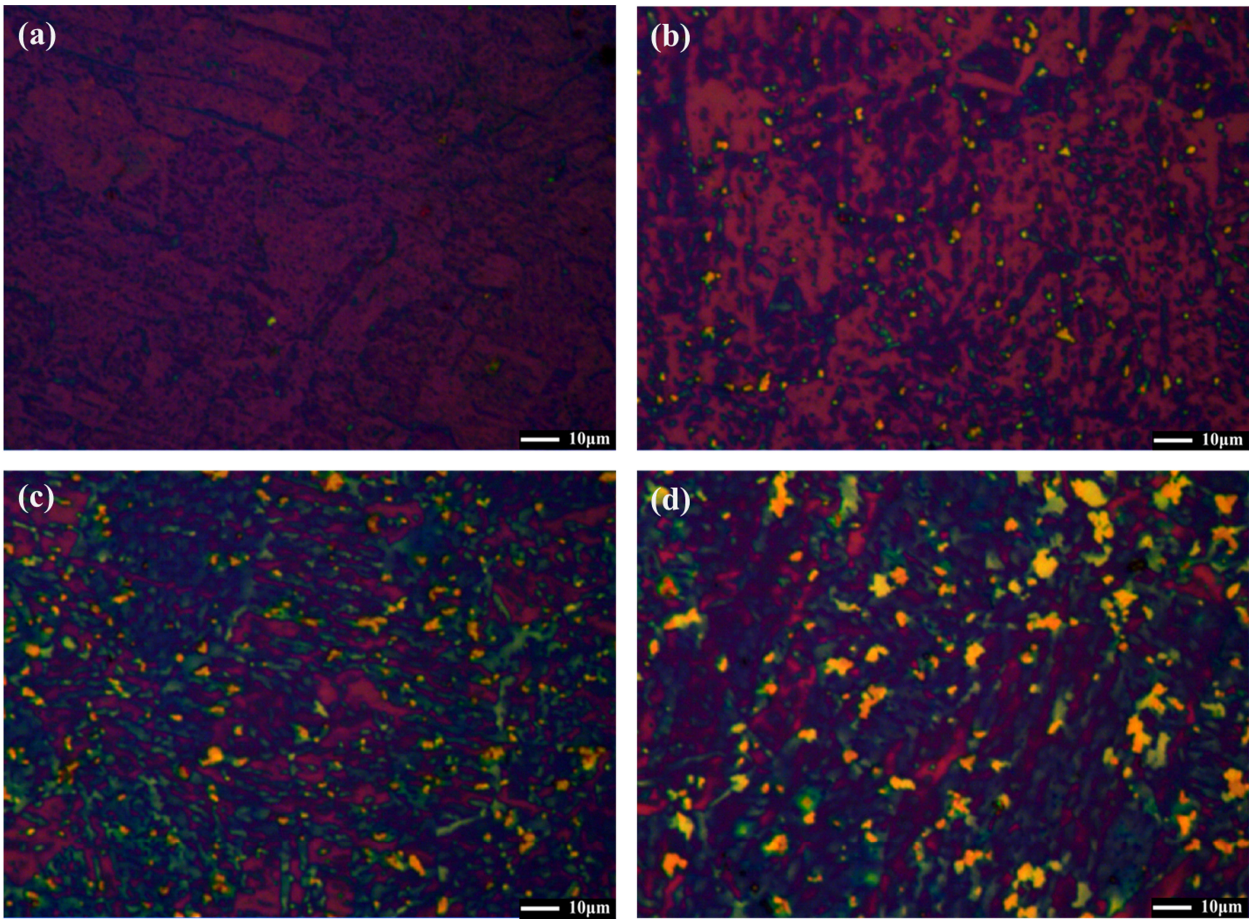

Figure S3. Optical microscope images of the graphene samples annealed at 800°C (a), 850°C (b), 900°C (c), and 950°C (d).

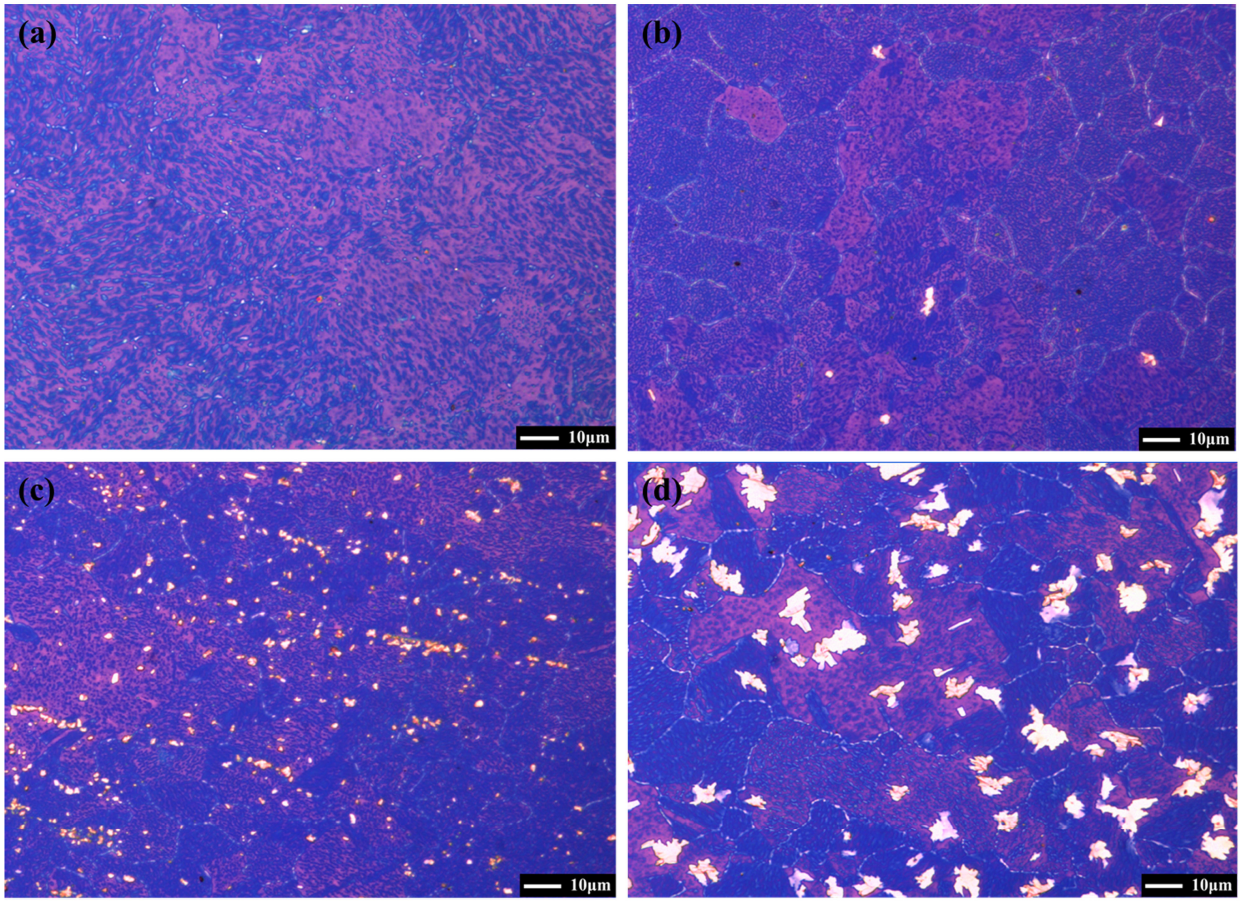

Figure S4. Optical microscope images of the graphene samples annealed at 950°C for 90s (a), 120s (b), 150s (c), and 180s (d).

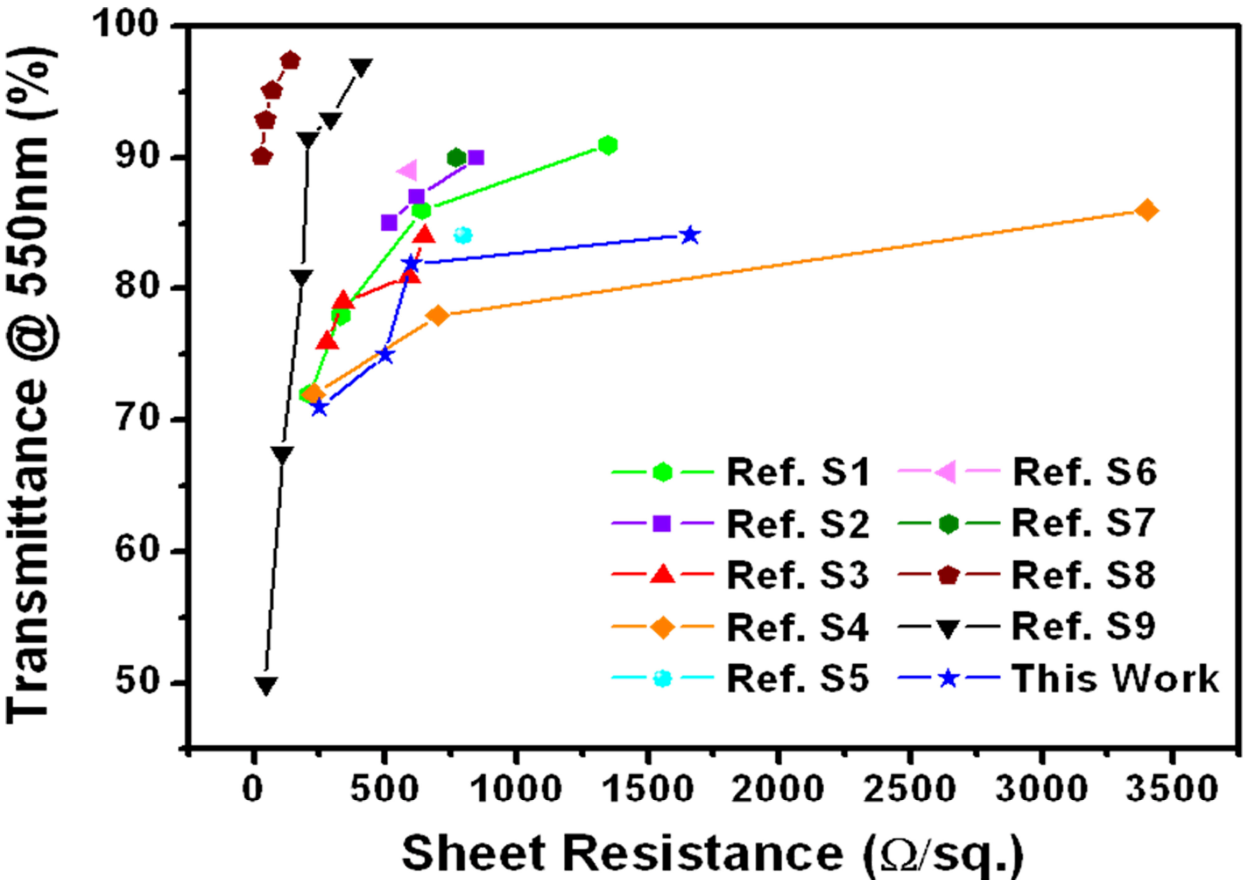

Figure S5. Comparison of transmittance versus sheet resistance for graphene samples from this work with those from gas-source CVD products reported before. Graphene was grown on nickel[S1-S7], copper[S8], or Ni-Cu alloy. [S9]

Table S1. Raman D to G peak ratio, 2D to G peak ratio, and FWHM of 2D peak of monolayer (red), bilayer (blue), and few-layer (black) graphene annealed at various temperatures.

	I_D/I_G	I_{2D}/I_G	FWHM (cm^{-1})
800 °C	1.22	2.08	43
	0.28	1.08	58
	0.23	0.56	75
850 °C	0.33	2.49	44
	0.13	1.07	57
	0.02	0.48	67
900 °C	0.13	3.09	35
	0.08	1.02	49
	0.05	0.99	70
950 °C	0.13	3.63	34
	0.06	1.09	47
	0.03	0.45	66

Table S2. Raman D to G peak ratio, 2D to G peak ratio, and FWHM of 2D peak of monolayer (red), bilayer (blue), and few-layer (black) graphene annealed for various durations.

	I_D/I_G	I_{2D}/I_G	FWHM (cm^{-1})
90 s	0.58	2.50	40
	0.44	1.06	54
	0.41	0.99	54
120 s	0.44	2.28	40
	0.28	1.26	49
	0.07	0.45	76
150 s	0.36	2.26	44
	0.11	1.02	57
	0.07	0.43	81
180 s	0.16	2.83	39
	0.07	1.01	52
	0.05	0.64	66

Reference

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