Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Highly transparent and conducting ultralarge graphene oxide/single-walled carbon nanotube hybrid films produced by Langmuir-Blodgett assembly

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Supplementary Materials

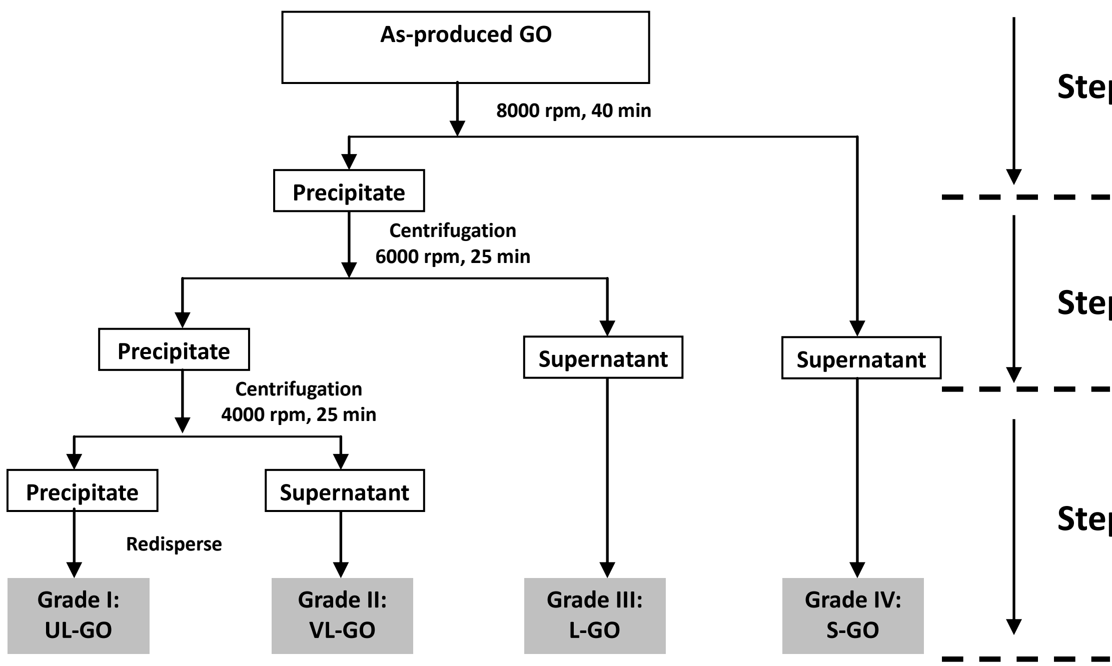
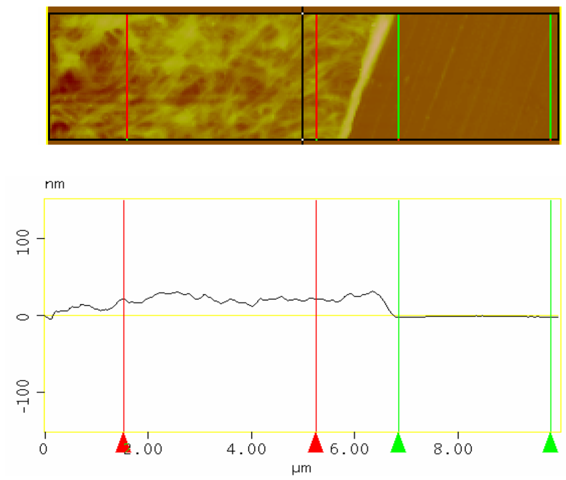
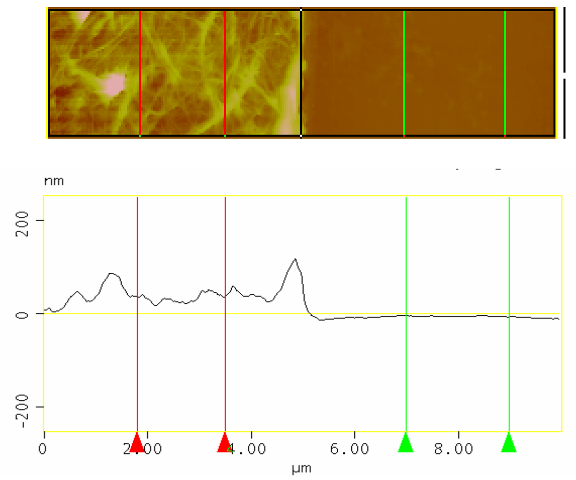


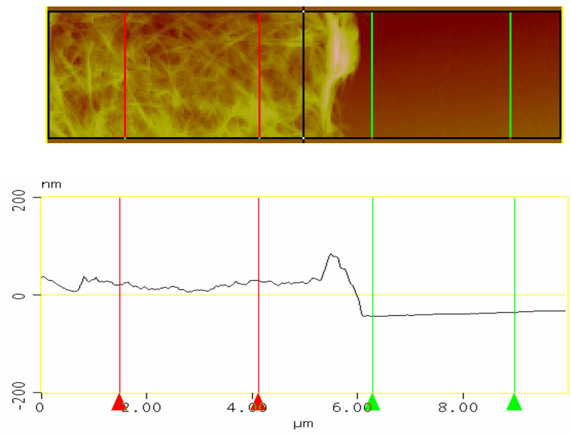
Fig. S1 Process flow for sorting as-prepared GO into four different groups of uniform sizes: ultralarge GO (UL-GO), very large GO (VL-GO), large GO (L-GO) and small GO (S-GO).



2.5 bilayers, t=22.8 nm



3.5 bilayers, t=38.4 nm



4.0 bilayers, t=56.4 nm

Figure S2. Thickness of GO/SWCNT hybrid thin films as a function of number of bilayers measured by AFM.

Table S1. Comparison of optoelectrical properties of graphene-based thin films.

TCF type	Fabrication method	Sheet resistance (Ω/sq)	Transmittance (%)	$\sigma_{DC} / \sigma_{OP}$	Reference
rGO/CNT hybrid films	**L-B assembly and high temperature annealing**	**257.4**	**82**	**6.88**	**Current result for hybrid films**
		183.5	**77**	**7.48**	
	Electrostatic self-assembly and high temperature annealing	1.51 x10^5	93	0.03	Kim et al.[1] Langmuir, **2009**, *25*, 11302
	Spin coating and high temperature annealing	631	81.3	2.74	Huang et al.[2] *ACS Nano*, **2011**, *5*, 6262
	Electrostatic self-assembly and high temperature annealing	8000	81.0	0.21	Hong et al.[3] *ACS Nano* **2010**, 4, 3861
Thermally reduced GO films	L-B assembly	531.7	80	3.07	Our previous study (Without additional chemical treatment) Zheng et al.[4] *ACS Nano* **2011**, *4*, 6039
		349.7	74	3.28	
	L-B assembly	4.0x10^6	95	0.0018	Kim *et al.*[5] Adv. Mater. 2010, 22, 1954
	Transfer printing	1598	82	1.09	Zheng *et al.*[6] Carbon 2011, 49,

					2905
	Transfer printing	6848	82	0.27	Wang *et al.*[7] Carbon 2010,48,1815-1823
	Spin coating	1000	80	1.60	Becerril *et al.*[8] ACS Nano 2008, 2,463
	Spin coating	800	82	2.26	Wu *et al.*[9] ACS Nano, 2010, 4, 43
	Spin coating	5000	80	0.32	Wu *et al.*[10] APL 2008, 92, 263302
	Spin coating	1750	70	0.55	Liang *et al.*[11] Nanotechnology, 2009, 20, 434007
	Dip coating	1800	70	0.54	Wang *et al.*[12] Nano Lett. 2008, 8,323
	Dip coating	8000	70	0.12	Zhao *et al.*[13] Electrochimica Acta, 2009, 55, 491
Graphene	L-B assembly of expandable Graphite exfoliated with DMF	$1.5x10^5$	92	0.03	Li *et al.*[14] Nature Nanotechnol. 2008, 3, 538
	Spray coating of graphite exfoliated with DMF	5000	90	0.697	Blake *et al.*[15] Nano Lett. 2008, 8,1704

	CVD on Ni substrate	1000	90	3.48	Reina *et al.*[16] Nano Lett. 2009,9,30
	CVD on Ni substrate	280	80	5.70	Kim *et al.*[17] Nature 2009, 457, 706
	CVD on Ni substrate	1350	91	2.89	Wang *et al.*[18] APL, 2009, 95,063302
	CVD on Cu substrate	350	90	9.96	Li *et al.*[19] Nano Lett. 2009, 9,4359
	CVD on Cu substrate	200	85	11.13	Cai *et al.*[20] APL 2009, 95, 123115
	CVD on Cu substrate	125	97.4	113.7	Bae et al.[21] *Nat. Nanotechnol.* **2010**, *5*, 574
Graphene Oxide	Spin coating	1011	90	3.5×10^{-8}	Becerril *et al.*[8] ACS Nano 2008, 2,463

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