Supporting Information for

Artificial nacre nanocomposites based on all-inorganic nanoarchitectures with high mechanical properties and dye separation performance

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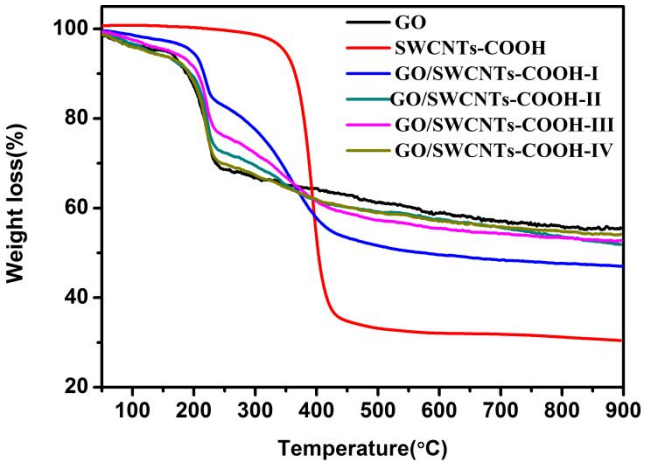

Figure S1. TGA curves of pure GO film, SWNTs-COOH film, and GO/SWNTs-COOH nanocomposites. The curves were obtained under atmosphere of nitrogen with a temperature rising rate of 10℃min^{-1}.

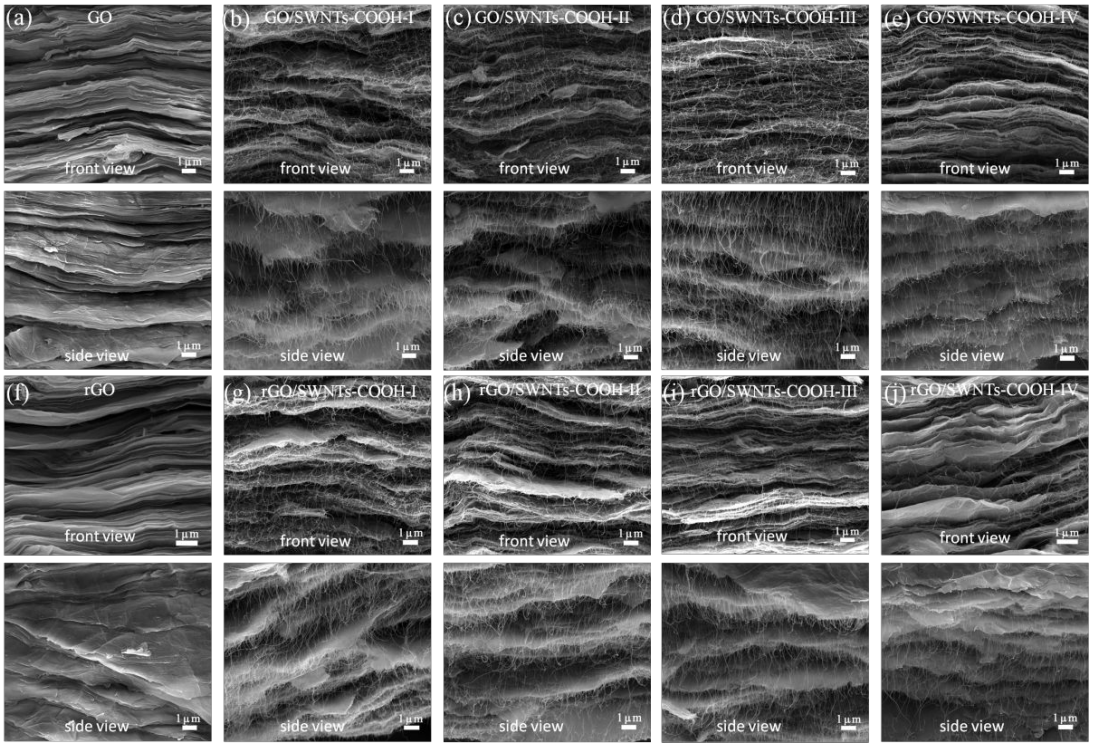

Figure S2 The fracture morphology of (a) GO film, (b-e) GO/SWNTs-COOH nanocomposites, (f) rGO film, and (g-j) rGO/SWNTs-COOH nanocomposites.

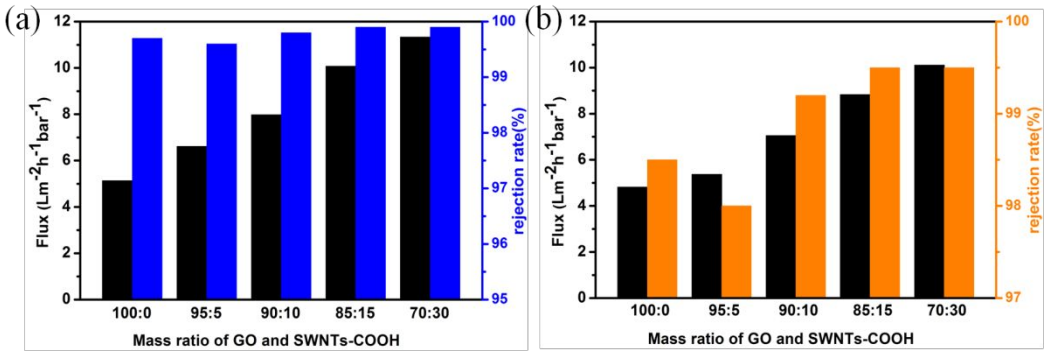

Figure S3 Water fluxes and rejection rates when separating (a) EB solution and (b) MO solution by GO/SWNTs-COOH nanocomposites with different mass ratio of GO and SWNTs-COOH.

Table S1. GO content of GO/SWNTs-COOH nanocomposites determained by TGA

Sample	Input GO content (wt%)	GO content by TGA (wt%)
GO/SWNTs-COOH-I	70	70.01
GO/SWNTs-COOH-II	85	85.82
GO/SWNTs-COOH-III	90	89.25
GO/SWNTs-COOH-IV	95	94.69

Table S2. The *d*-spacing of pure GO film, GO/SWNTs-COOH nanocomposites, rGO film and rGO/SWNTs-COOH nanocomposites.

Sample	2θ (°)	d-spacing (Å)
GO	11.86	7.46
GO/SWNTs-COOH-I	8.48	10.42
GO/SWNTs-COOH-II	9.04	9.77
GO/SWNTs-COOH-III	10.22	8.65
GO/SWNTs-COOH-IV	10.58	8.36
rGO	23.98	3.71
rGO/SWNTs-COOH-I	23.40	3.80
rGO/SWNTs-COOH-II	23.66	3.76
rGO/SWNTs-COOH-III	23.72	3.75
rGO/SWNTs-COOH-IV	23.83	3.73

Table S3. The mechanical properties of pure GO film, SWNTs-COOH film, GO/SWNTs-COOH nanocomposites, rGO film and rGO/SWNTs-COOH nanocomposites.

Sample	Stress (MPa)	Toughness (MJ m^{-3})
GO	97.5±5.4	1.2±0.3
SWNTs-COOH	34.9±1.1	1.7±0.2
GO/SWNTs-COOH-I	129.1±6.3	2.9±0.3
GO/SWNTs-COOH-II	167.8±7.8	3.0±0.5
GO/SWNTs-COOH-III	213.0±7.1	3.7±0.3

GO/SWNTs-COOH-IV	187.3±4.8	2.6±0.2
rGO	124.1±3.8	2.1±0.2
rGO/SWNTs-COOH-I	171.1±10.5	4.9±0.4
rGO/SWNTs-COOH-II	248.1±8.5	5.9±0.6
rGO/SWNTs-COOH-III	305.7±5.6	7.1±0.4
rGO/SWNTs-COOH-IV	277.6±11.4	5.7±0.3

Table S4. The mechanical properties of natural nacre and other binary layered GO-based nanocomposites.

Layered materials	Stress (MPa)	Toughness (MJ m^{-3})	reference
Nacre	135	1.8	[47]
GO-PAA	91.9	0.15	[25]
GO-PDA	175	1.5	[29]
rGO-PDA	204.0	4	[29]
GO-PMMA	148.3	2.35	[26]
GO-PVA	118	0.71	[9]
rGO-PVA	188.9	2.52	[9]
GO-GA	101	0.3	[30]
GO-PEI	209.9	0.23	[31]
GO-SL	125	1.6	[27]
rGO-SL	300	2.8	[27]
rGO-PAPB	382	7.5	[28]
GO-PCDO	106.6	2.52	[32]
rGO-PCDO	129.6	3.91	[32]
GO-SSEBS	158	15.3	[34]
rGO/SWNTs-COOH-III	305.7	7.1	This work

Table S5. Comparison of the permeability and rejection in different membranes.

Membrance	Dye	Flux (L m^{-2} h^{-1} bar^{-1})	R%	Ref
G-CNTm(2:1)	MO	8.69	96.1	[S1]
rPGMs	MO	5.3	97.5	[S2]
GO@PA6	MO	11.15	99	[S3]
GO/MB	MO	3.83	96.37	[S4]
GM-60%	MB	13.01	98.	[S5]
GM-70%	MB	16.69	98.5	[S5]
GO/SWNTs-COOH-I	MO	10.11	98	This work
GO/SWNTs-COOH-I	EB	11.33	99.6	This work

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