Supporting Information

Graphene-Templated Synthesis of Magnetic Metal Organic Framework Nanocomposite for Selective Enrichment of Biomolecules

Gong Cheng, [†,‡] *Zhi-Gang Wang,*[†,‡] *Sachira Denagamage,*[§] *and Si-Yang Zheng**[,†,‡]

[†]Department of Biomedical Engineering, The Pennsylvania State University, University Park, PA 16802, United States. E-mail: sxz10@psu.edu

[‡]Material Research Institute, The Pennsylvania State University, University Park, PA 16802, United States.

[§]Department of Biology, The Pennsylvania State University, University Park, PA 16802, United States.

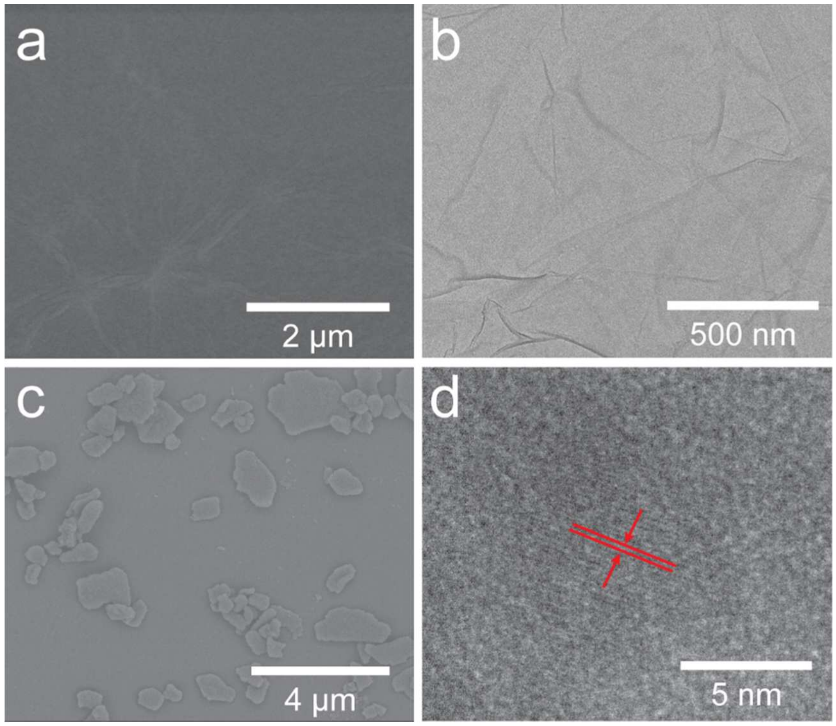

Figure S1 SEM (a) and TEM (b) images of the prepared GO. SEM (c) and high resolution TEM image (d) of MGMOF composite materials.

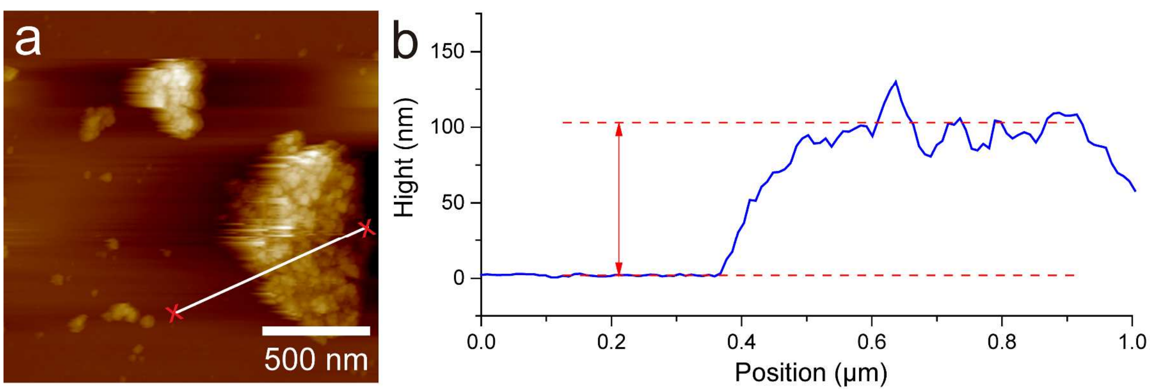

Figure S2 AFM scanning image of MGMOF composites (a) and a height profile along the line (b). Note: because the MGMOF composite contain two layers of MOF, the thickness of MOF is half of the thickness of MOF layer.

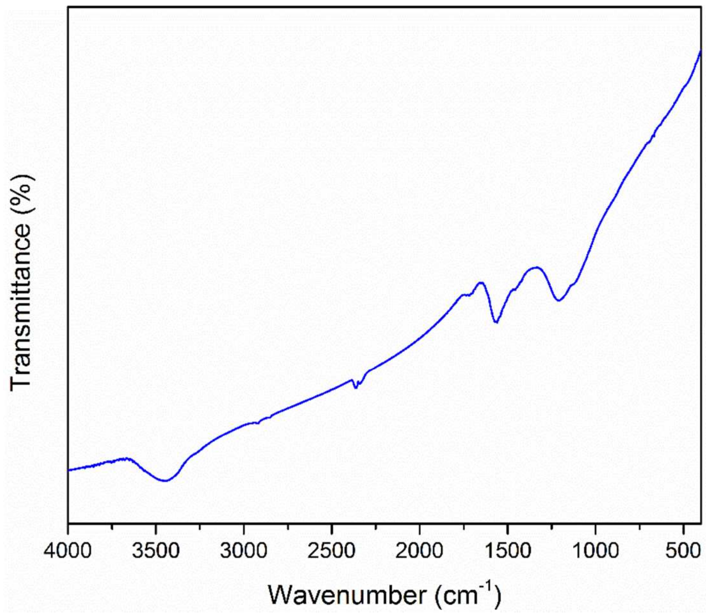

Figure S3 FTIR spectrum of the reduced graphene oxide using the solvothermal strategy.

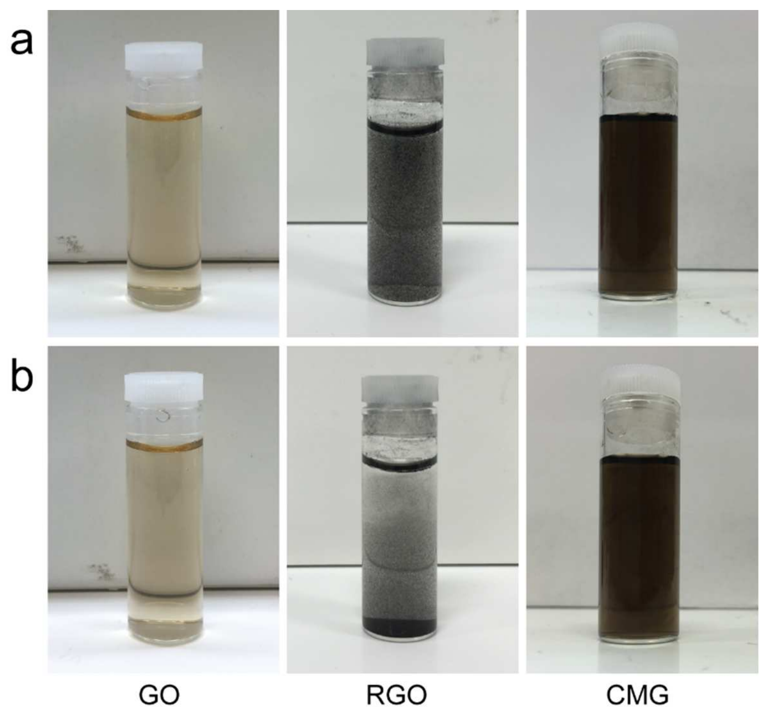

Figure S4 Aqueous dispersion of graphene based composite materials. (a) Freshly prepared dispersion, (b) after standing for half an hour.

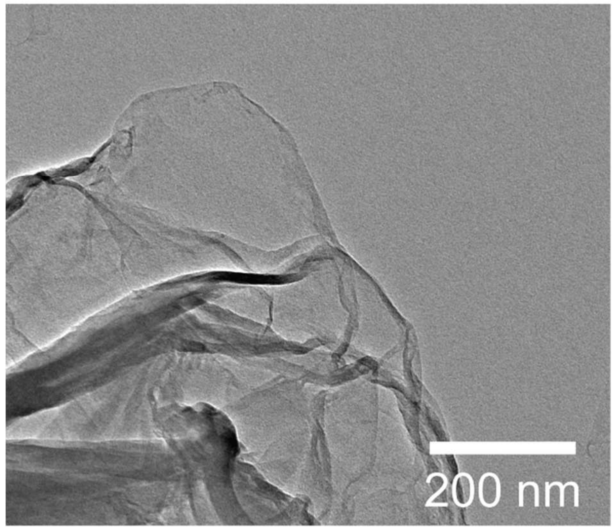

Figure S5 TEM image of the graphene (reduced graphene oxide) after self-assembly of metal organic frameworks for 15 cycles. No apparent metal organic framework can be observed on the graphene sheet.

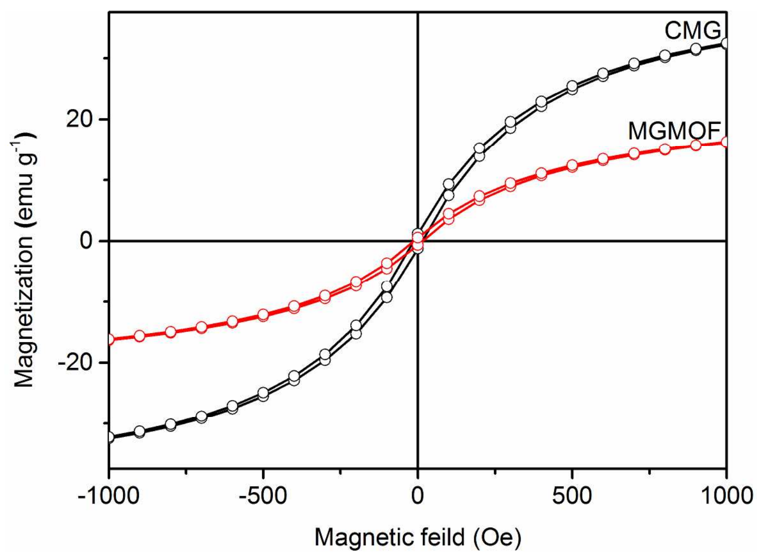

Figure S6 Room-temperature magnetization curves of CMG and MGMOF microspheres at relatively low magnetic field.

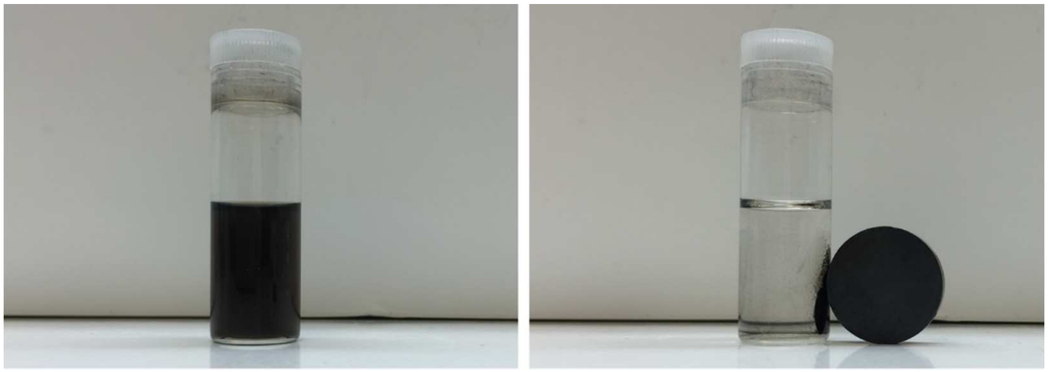

Figure S7 Fast separation of MGMOF composites with the help of a magnet. Left: dispersion of MGMOF composites; right: MGMOF dispersion after magnetic separation.

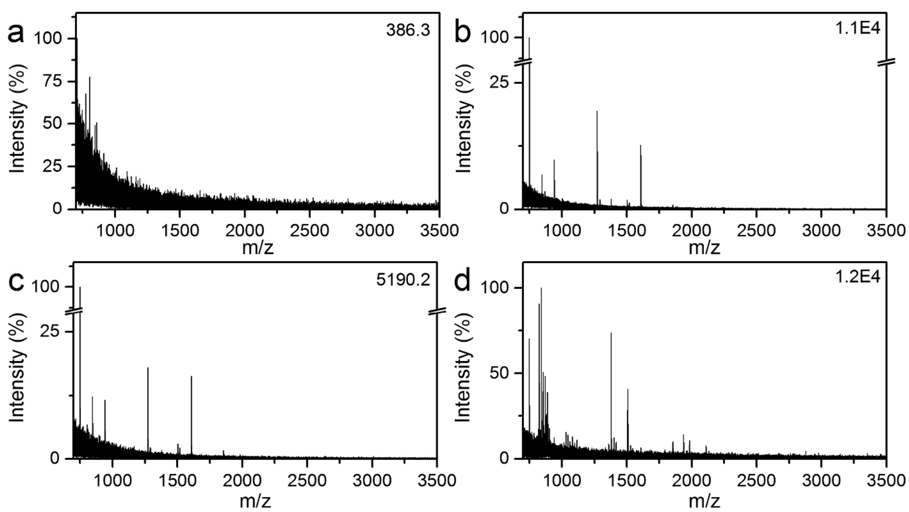

Figure S8 MALDI-TOF mass spectra of a diluted MYO digest after enrichment with (a) GO, (b) RGO, (c) CMG and (d) bulk MOF materials, respectively.

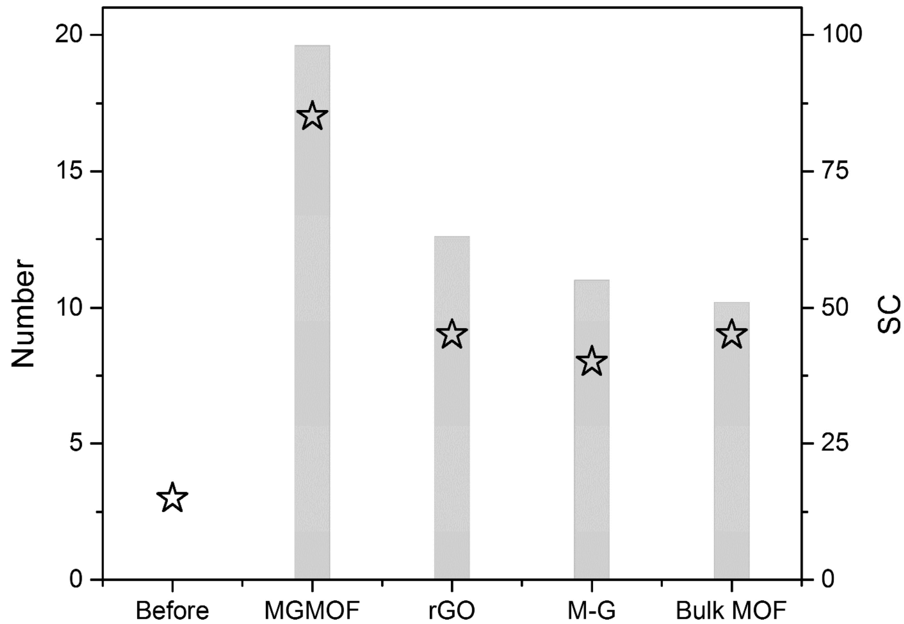

Figure S9 The number of identified peptides (stars, left axis) and the sequence coverage (SC, column, right axis) of the original proteins.

Table S1 The peptides enriched from MYO digest MGMOF composites.

Start-End	MW	Sequence
2-17	1814.90	M.GLSDGEWQQVLNVWGK.V
18-32	1605.85	K.VEADIAGHGQEVLIR.L
33-43	1270.66	R.LFTGHPETLEK.F
33-46	1660.85	R.LFTGHPETLEKFDK.F
49-57	1085.55	K.HLKTEAEMK.A
52-57	707.32	K.TEAEMK.A
58-64	789.42	K.ASEDLKK.H
65-78	1377.83	K.HGTVVLTALGGILK.K
65-79	1505.93	K.HGTVVLTALGGILKK.K
80-97	1505.93	K.KGHHEAELKPLAQSHATK.H
81-97	1852.95	K.GHHEAELKPLAQSHATK.H
98-103	734.48	K.HKIPIK.Y

104-119	1884.01	K.YLEFISDAIIHVLHSK.H
120-134	1501.66	K.HPGDFGADAQGAMTK.A
135-140	747.43	K.ALELFR.N
135-146	1359.75	K.ALELFRNDIAAK.Y
147-154	940.47	K.YKELGFQG.
Matched peptides		17
Sequence coverage (%)		98

Table S2 The peptides enriched from BSA digest by the MGMOF composites.

Start-End	MW	Sequence
29-34	711.37	K.SEIAHR.F
35-44	1248.61	R.FKDLGEEHFK.G
66-75	1162.62	K.LVNELTEFAK.T
89-105	1887.988	K.SLHTLFGDELCKVASLR.E
161-167	926.49	K.YLYEIAR.R
168-183	2044.02	R.RHPYFYAPELLYYANK.Y
198-204	700.39	K.GACLLPK.I
212-218	702.40	K.VLASSAR.Q
233-2421	1000.58	R.ALKAWSVAR.L
242-248	846.50	R.LSQKFPK.A
249-256	921.48	K.AEFVEVTK.L
257-263	788.46	K.LVTDLTK.V
341-346	751.35	K.NYQEAK.D
347-359	1566.74	K.DAFLGSFLYEYSR.R
360-371	1438.8	R.RHPEYAVSVLLR.L
361-371	1282.70	R.HPEYAVSVLLR.L
402-412	1304.71	K.HLVDEPQNLIK.Q

421-433	1478.79	K.LGEYGFQNALIVR.Y
437-451	1638.93	R.KVPQVSTPTLVEVSR.S
460-468	1051.44	R.CCTKPESER.M
499-507	1023.45	K.CCTESLVNR.R
548-557	1141.71	K.KQTALVELLK.H
549-557	1013.61	K.QTALVELLK.H
581-587	724.25	K.CCAADDK.E
Matched peptides		23
Sequence coverage (%)		34

Table S3 The peptides extracted from human urine by the MGMOF composite.

MW	S/N
701.7	12.79
705.76	10
717.68	12.47
757.79	12.32
787.67	10.04
827.89	11.13
882.84	13.09
920.76	12.54
982.99	18.7
1061.01	47.4
1077.08	72.96
1756.53	11.41
1768.48	11.3
1896.06	10.22
1912.81	224.14

1934.75	23.96
2191.66	333.18
2193.77	170.42
2194.79	125.59
2207.59	28.56
2213.37	45.24
2215.52	26.73
2229.72	32.81
2435.83	77.22
2438.76	49.34
2788.99	83.67
2792.04	38.76