

Supporting Information

Metal-organic frameworks@graphene hybrid aerogel for solid-phase extraction of non-steroidal anti-inflammatory drugs and selective enrichment of proteins

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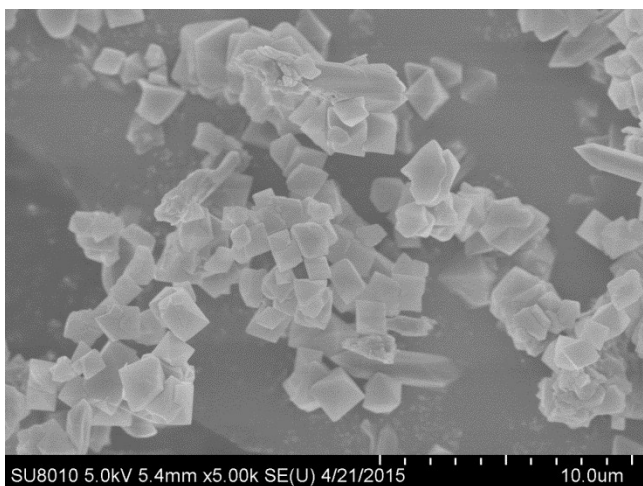


Fig. S1. SEM image of MIL-101.

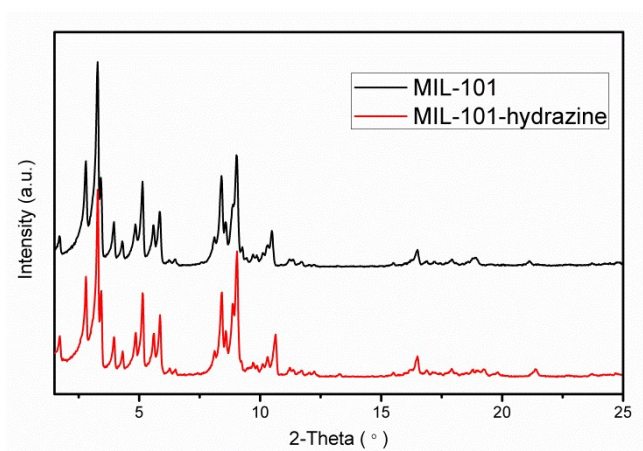


Fig. S2. XRD patterns of MIL-101 and MIL-101 treated by hydrazine vapor at 95 °C for 24 h.

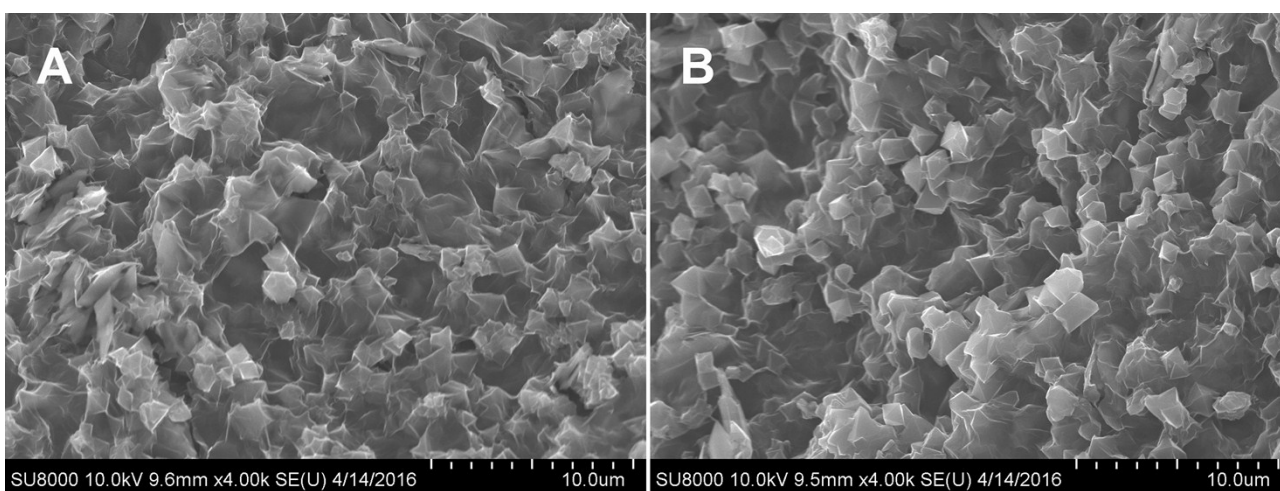


Fig. S3. SEM images of hybrid aerogels after (A) replicate extractions and (B) dramatic ultrasonic for 10 min in a mixture solution of EtOH and water.

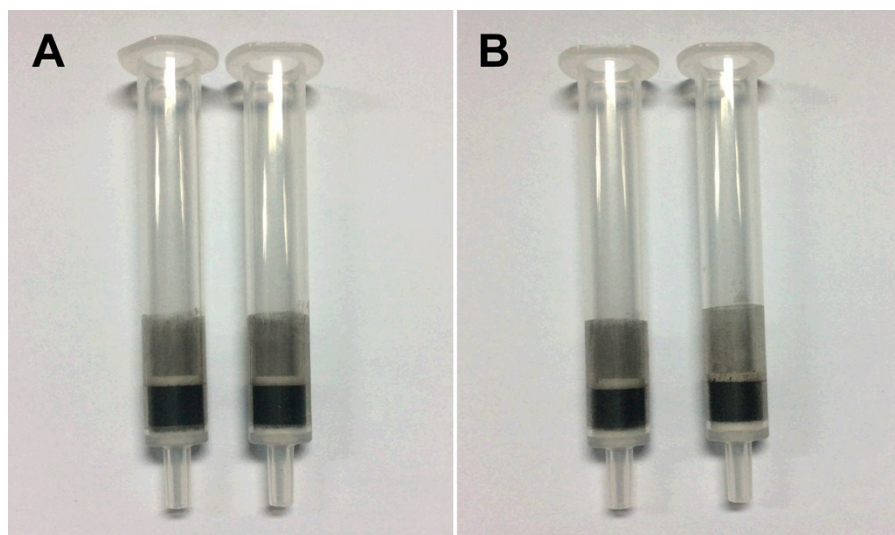


Fig. S4. Photographs of (A) newly prepared hybrid aerogel packed SPE cartridges and (B) SPE cartridges after 20 replicate extractions.

Table S1

Analytical figures of merit through MIL-101@graphene hybrid aerogel based SPE-HPLC-UV method.

Analyte	pKa	Regression equation ^a	R ²	Linear range (ng mL ⁻¹)	LOD (ng mL ⁻¹)	RSD (%)		
						Run-to- run (n=6)	Day-to- day (n=3)	Cartridge-to- cartridge (n=4)
Naproxen	4.39	$y = 0.21478x + 0.05264$	0.9996	0.2 – 50	0.01	6.1	4.3	5.5
Felbinac	4.30	$y = 0.03735x + 0.00176$	1.0000	0.2 – 50	0.08	4.4	4.6	4.8
Carprofen	4.42	$y = 0.08628x - 0.00782$	0.9997	0.2 – 50	0.03	5.6	5.3	9.1
Flurbiprofen	4.42	$y = 0.03066x + 0.02130$	0.9984	0.2 – 50	0.04	8.5	9.0	6.0
Ibuprofen	4.38	$y = 0.03806x + 0.02115$	0.9973	0.2 – 50	0.10	3.7	3.4	5.0

^ay=peak area in mAU min and x= concentration in ng mL⁻¹.

Table S2

Comparison of different methods for the determination of non-steroidal anti-inflammatory drugs.

Method	Detection	Sample volume	LOD	Refs.
		(mL)	(ng mL ⁻¹)	
Hollow fiber liquid-phase microextraction	UPLC-MS/MS	5	0.5-1.25	[38]
C18 sorbent based microextraction	HPLC-PDA	0.1	0.03	[39]
Electromembrane extraction	HPLC-DAD	10	0.08-3.36	[40]
Magnetic matrix solid phase dispersion	HPLC-UV	1000	1-2	[41]
Immobilized carboxylated carbon nanotubes based SPE	CE-MS	5	1.6-2.6	[42]
MIL-101@graphene hybrid aerogel based SPE	HPLC-UV	100	0.01-0.10	This work

Table S3

Recoveries of environmental water samples spiked with five NSAIDs (n=3).

Analyte	Concentration added (ng mL ⁻¹)	Tap water samples		River water samples	
		Recovery (%)	RSD (%)	Recovery (%)	RSD (%)
Naproxen	0.5	97.6	3.8	92.6	3.6
	2.0	105.0	5.7	80.8	3.4
Felbinac	0.5	105.5	3.3	99.4	8.7
	2.0	106.9	3.6	89.7	2.3
Carprofen	0.5	106.5	2.5	87.7	7.3
	2.0	99.1	3.7	83.2	4.1
Flurbiprofen	0.5	82.6	2.6	96.2	5.3
	2.0	93.8	5.5	96.3	6.0
Ibuprofen	0.5	96.2	4.2	102.6	4.6
	2.0	92.0	3.4	105.8	4.0