ZIF-8 Assisted Polyacrylamide Functionalized Silica Core-Shell Stationary Phase for Hydrophilic Interaction Liquid Chromatography

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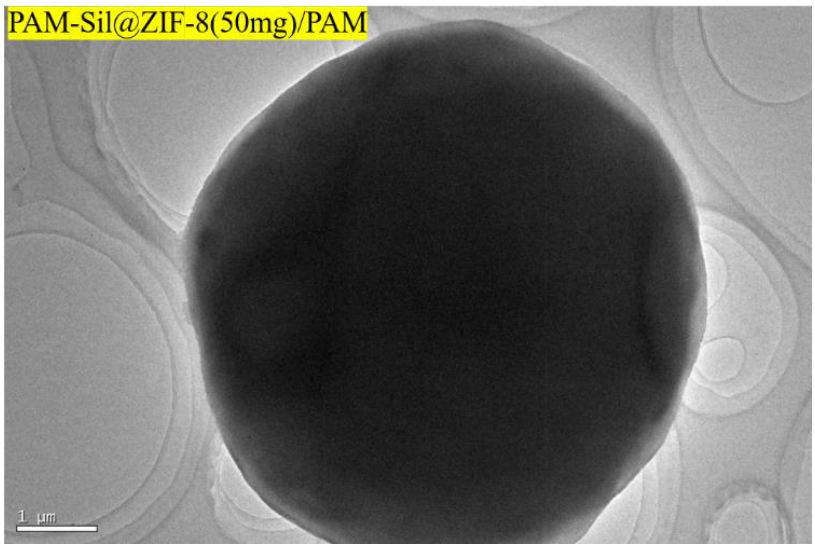

Figure S1. TEM image of PAM-Sil@ZIF-8(50mg)/PAM

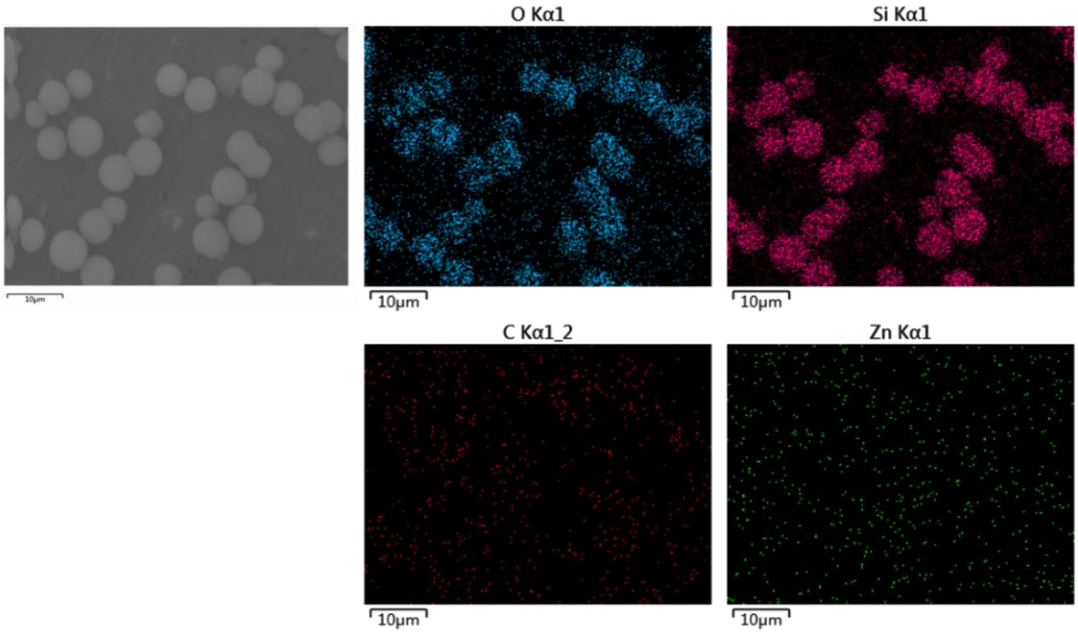

Figure S2. EDS images of PAM-Sil@ZIF-8(50mg)/PAM and distribution of O, Si, C and Zn elements

Table S1. BET analysis results of bare silica, PAM/Sil and PAM-Sil@ZIF-8(50mg)/PAM.

BET Analysis	Bare silica	Sil/PAM	PAM-Sil@ZIF-8(50mg)/PAM
BET Surface Area (m^2/g)	371.5	312.9	354.4
Adsorption pores volume (cm^3/g)	0.69	0.65	0.67
Adsorption average pore width (nm)	7.4	8.3	7.6

Table S2. The resolution of five alkaloids over different columns

The type of columns	Resolution				
	Caffeine	Colchicine	Theophylline	Berberine	Coptisine
PAM-Sil@ZIF-8(50mg)/PAM	$R_{1/2}$=0.96	$R_{2/3}$=2.89	$R_{3/4}$=2.16	$R_{4/5}$=1.09	
Sil/PAM	$R_{1/2,3}$=0.62	$R_{2/3}$=0	$R_{2,3/4}$=4.5	$R_{4/5}$=0.84	
amino-modified silica	$R_{1/2,3}$=0.33	$R_{2/3}$=0.33	$R_{3/4}$=0.64	$R_{4/5}$=0.49	

Table S3. Column efficiency of five analytes over different columns

The type of columns	Column efficiency(plates/m)				
	Caffeine	Colchicine	Theophylline	Berberine	Coptisine
PAM-Sil@ZIF-8(50mg)/PAM	4667.5	7861.9	1659.9	4472.1	5312.3
Sil/PAM	6072.7	-	-	1634.8	3564.1
amino-modified silica	1689.6	1043.1	844.3	2976.5	622.8

Table S4. The results of regression coefficient of Eq. (1) for five amino acids on the PAM-Sil@ZIF-8(50mg)/PAM.

Analytes	a	b	c	R^2
L-tryptophan	-9.4979	-5.7339	12.2663	0.9845
DL-phenylalanine	-8.4638	-5.3847	11.1194	0.9872
L-isoleucine	-7.8861	-5.2132	10.3120	0.9840
L-valine	-7.3729	-5.1611	9.5110	0.9890
L-serine	-10.3908	-7.0068	13.9572	0.9771

Table S5. Fitting coefficients and corresponding correlation coefficient for Eq. (2)

Analytes	$\triangle S(J \cdot mol^{-1} \cdot K^{-1})$	$\triangle H(kJ \cdot mol^{-1} \cdot K^{-1})$	R^2
Uridine	-60.06	-17.17	0.9680
Adenosine	-43.80	-13.99	0.9817
Inosine	-45.29	-15.41	0.9740
Cytosine	-32.30	-12.52	0.9856
Citicoline	-51.42	-19.02	0.9912

Table S6. Reproducibility of PAM-Sil@ZIF-8(50mg)/PAM.

Analytes	RSD(n=7)
uridine	0.27%
adenosine	0.22%
inosine	0.51%
Cytosine	0.34%
Citicoline	0.97%

Table S7. Stability of PAM-Sil@ZIF-8(50mg)/PAM

Analytes	RSD(n=10)
uridine	0.57%
adenosine	0.68%
inosine	0.99%
Cytosine	1.86%
Citicoline	1.04%