Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Preparation of amino acid-based polymer monolith for trimodal liquid chromatography

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Table S1. Mechanical properties and back pressures of monoliths with different preparative compositions

Column	1	2	3	4	5
MA-L-Phe-OMe (mg)	200.0	200.0	0	100.0	300.0
MBA (mg)	300.0	300.0	500.0	400.0	200.0
Dodecanol (mL)	0.3	2.0	2.0	2.0	2.0
DMSO (mL)	1.8	1.8	1.8	1.8	1.8
Mechanical properties	Extremely hard	Quit hard, fluffy	Extremely soft	Hard, fluffy	Quit hard, fluffy
[a] Back pressure (MPa)	>18.0	7.1	1.4	1.7	>18.0

[a] Measured at the flow rate of 1.0 mL/min with water as the mobile phase.

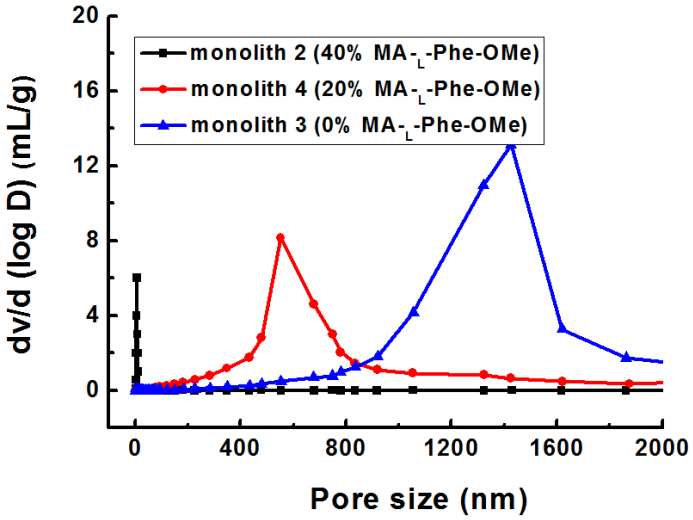

Fig. S1. Pore size distributions of monolith 2, monolith 3 and monolith 4.

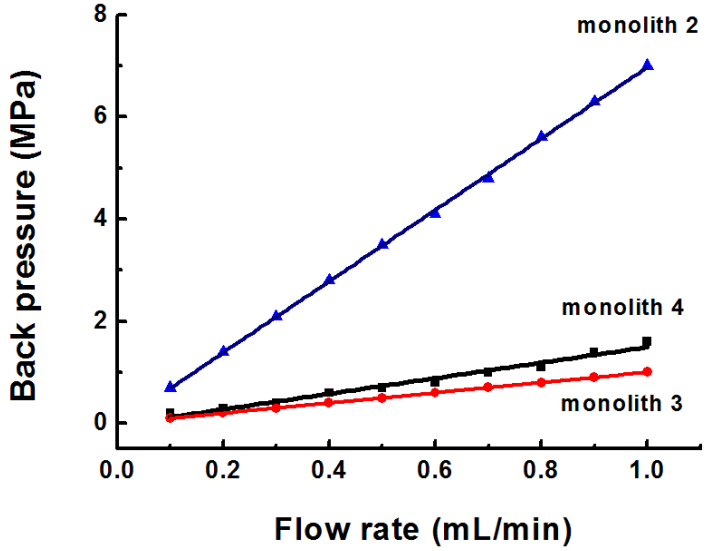

Fig. S2. Back pressures of monolith 2, monolith 3, and monolith 4 at different flow rates.

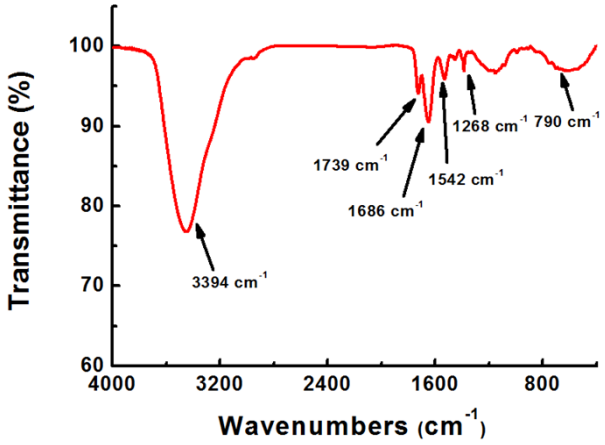

Fig. S3. FT-IR spectra of typical poly(MA-$_L$-Phe-OMe-co-MBA) monolith.

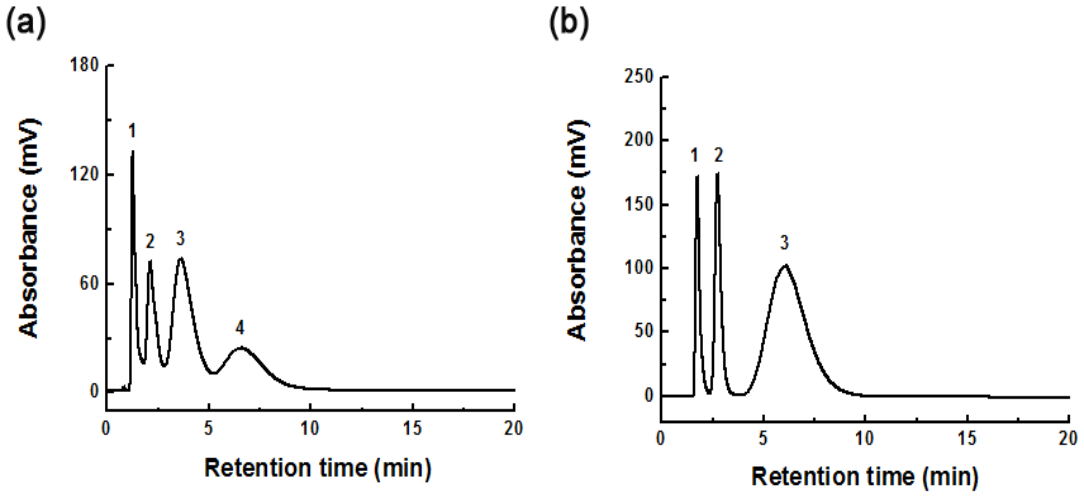

Fig. S4. Chromatograms for separations of (a) polycyclic aromatic hydrocarbons and (b) nucleobases/nucleosides on poly(MA-$_L$-Phe-OMe-co-MBA) monolith. Chromatographic conditions: column, monolith 2; mobile phase, ACN/water (60/40, v/v) for (a) and ACN/water (90/10, v/v) for (b); flow rate, 1.0 mL/min; detection, 254 nm. Peak: (a-1), toluene; (a-2), fluorene; (a-3), pyrene; (a-4), perylene; (b-1), uracil; (b-2), adenine; (b-3), 2'-deoxy guanosine.

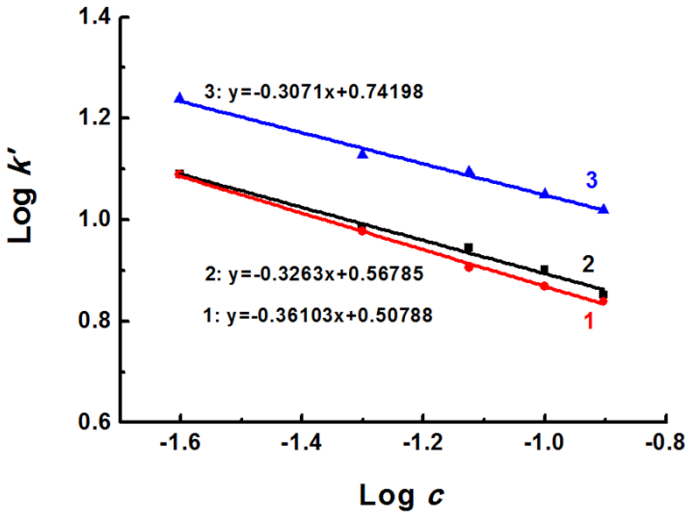

Fig. S5. Plots for log *k'* *vs*. log *c*. Log *k'*, where *k'* is the retention factor of benzoic acid. Log *c*, where *c* is the NaCl concentration in mobile phase. Chromatographic conditions: coumn, monolith 2; mobile phase, 20.0 mM sodium phosphate buffer (pH = 4.0) containing NaCl with various concentrations; flow rate, 1.0 mL/min; UV detection, 254 nm. Analytes: 1. niacin; 2. salicylic acid; 3. 4-chlorobenzoic acid.

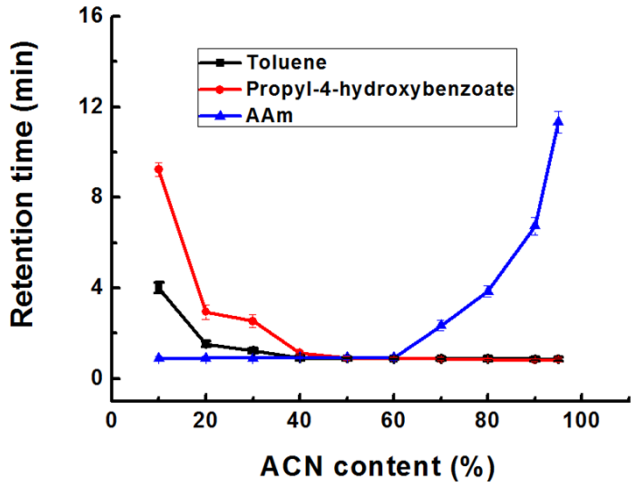

Fig. S6. Effect of ACN percentage on the retention times of toluene, propyl-4-hydroxybenzoate, and AAm on poly(N-methacryloyl-$_L$-proline methyl ester-co-MBA) monolith. Chromatographic conditions: mobile phase, ACN-water; flow rate, 1.0 mL/min; UV detection, 254 nm. Error bars represent the standard deviations for three replicate determinations.

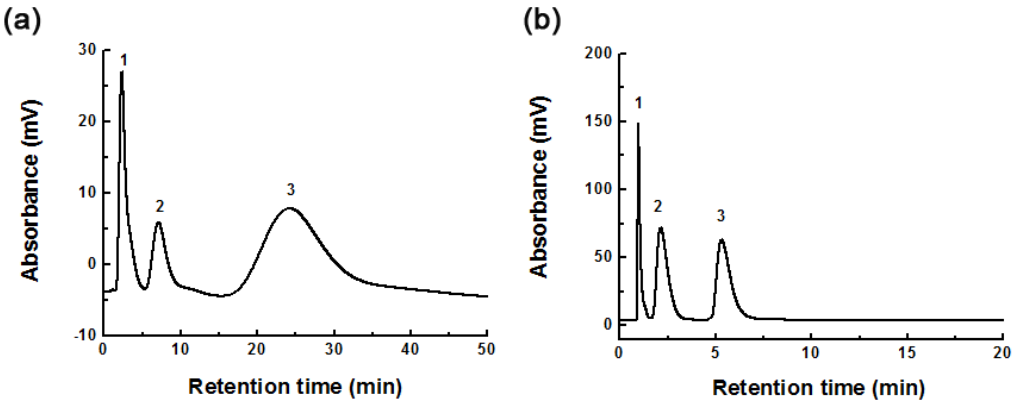

Fig. S7. Chromatograms for separations of (a) polycyclic aromatic hydrocarbons and (b) nucleobases/nucleosides on poly(N-methacryloyl-L-proline methyl ester-co-MBA) monolith. Chromatographic conditions: mobile phase, ACN/water (20/80, v/v) for (a) and ACN/water (85/15, v/v) for (b); flow rate, 1.0 mL/min; detection, 254 nm. Peak: (a-1), toluene; (a-2), fluorene; (a-3), pyrene; (b-1), uracil; (b-2), adenine; (b-3), 2'-deoxy guanosine.

Table S2. Chromatographic data of separations of polycyclic aromatic hydrocarbons on monoliths prepared with different monomer/crosslinker ratios

Analytes	Monolith 2 (40% monomer)			Monolith 3 (0% monomer)			Monolith 4 (20% monomer)		
	t_R[a] (min)	$W_{0.5}$ (min)	R	t_R[a] (min)	$W_{0.5}$ (min)	R	t_R[a] (min)	$W_{0.5}$ (min)	R
Toluene	1.26	0.21	2.88	0.72	0.22	2.14	1.14	0.23	2.97
Fluorene	2.11	0.38	1.79	1.32	0.67	1.34	2.09	0.56	1.27
Pyrene	3.62	1.31	1.79	2.80	1.32	1.49	3.33	1.39	1.50
Perylene	6.61	2.02		4.33	2.99		6.10	2.30	

[a] Chromatographic conditions: mobile phase, ACN/water (60/40, v/v) ; flow rate, 1.0 mL/min; detection, 254 nm.

Table S3. Chromatographic data of separations of nucleobases/nucleosides on monoliths prepared with different monomer/crosslinker ratios

Analytes	Monolith 2 (40% monomer)			Monolith 3 (0% monomer)			Monolith 4 (20% monomer)		
	t_R[a] (min)	$W_{0.5}$ (min)	R	t_R[a] (min)	$W_{0.5}$ (min)	R	t_R[a] (min)	$W_{0.5}$ (min)	R
Uracil	1.74	0.22	2.13	2.33	0.25	8.16	2.11	0.23	6.94
Adenine	2.74	0.32	1.64	4.86	0.37	12.21	3.99	0.34	8.35
2'-deoxy guanosine	6.05	1.51		17.32	1.67		12.03	1.59	

[a] Chromatographic conditions: mobile phase, ACN/water (90/10, v/v) ; flow rate, 1.0 mL/min; detection, 254 nm.

Table S4. Repeatability of poly(MA-$_L$-Phe-OMe-co-MBA) monolith for the retention times of the analytes

Analytes	RSD (%)	
	Run-to-run (N=5)	Column-to-column (N=3)
Toluene	**2.12[a]**	**4.01[a]**
propyl-4-hydroxybenzoate	**1.96[a]**	**3.08[a]**
AAm	**2.59[b]**	**3.21[b]**

[a] Detected in mobile phase: water-ACN (10/90, v/v). b Detected in mobile phase: water-ACN (90/10, v/v).

Table S5. Chromatographic data of separations of proteins on poly(MA-$_L$-Phe-OMe-co-MBA) monolith

Analytes	t_R (min)	$W_{0.5}$ (min)	R
Con A	3.66	0.67	5.09
Pep	8.35	1.17	19.50
Ova	17.56	3.18	1.48
HSA	26.50	3.33	