Electronic Supplementary Information

Facile preparation of polyvinyl alcohol coated SiO_2 stationary phases for high performance liquid chromatography

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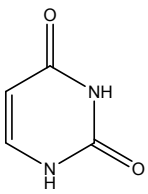

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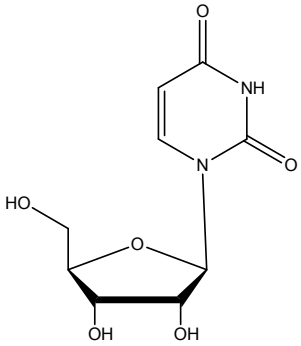

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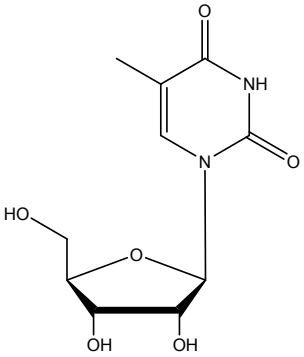

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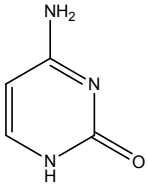

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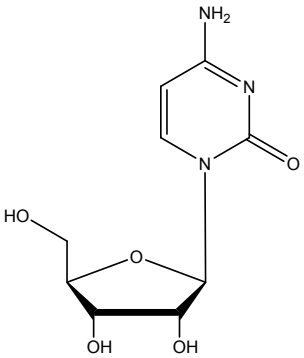

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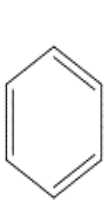

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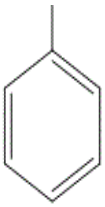

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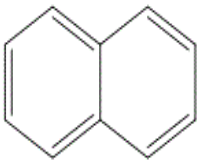

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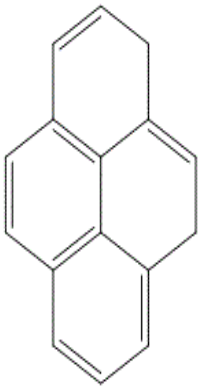

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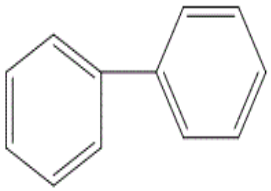

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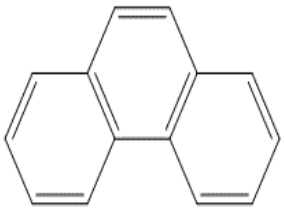

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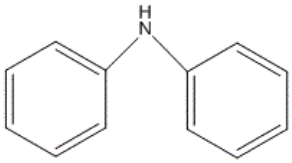

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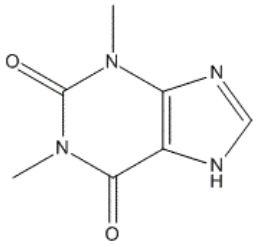

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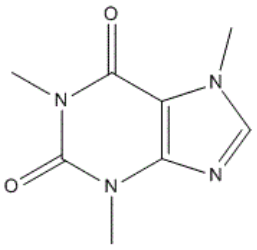

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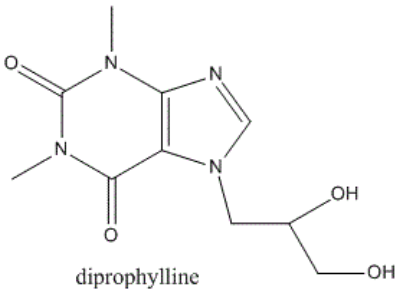
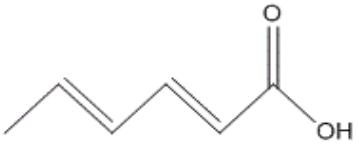


diprophylline



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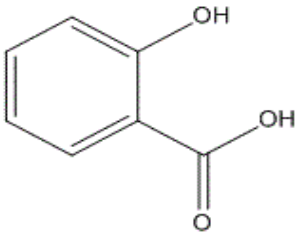

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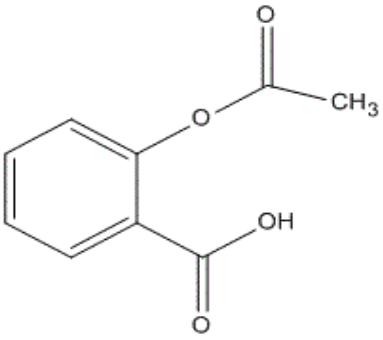
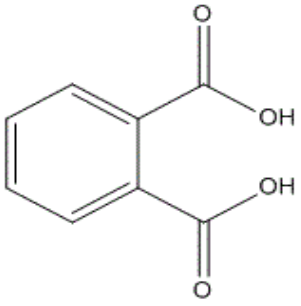
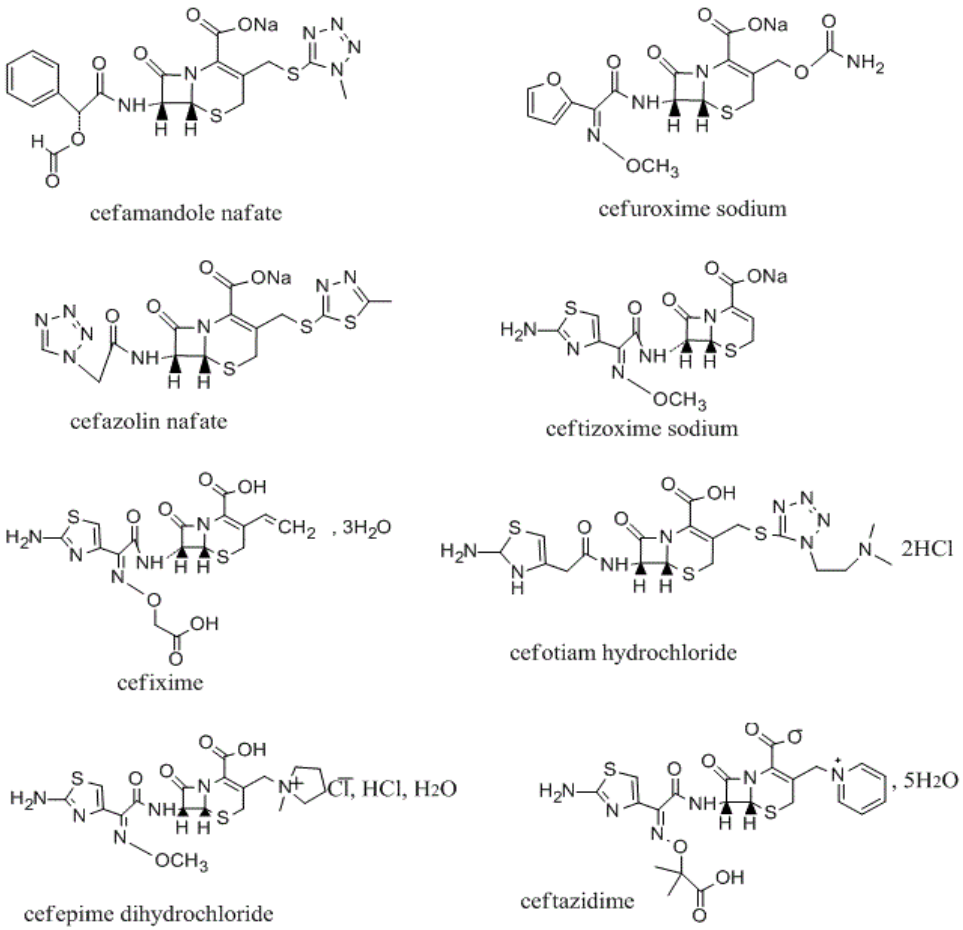


acetyl salicylic acid



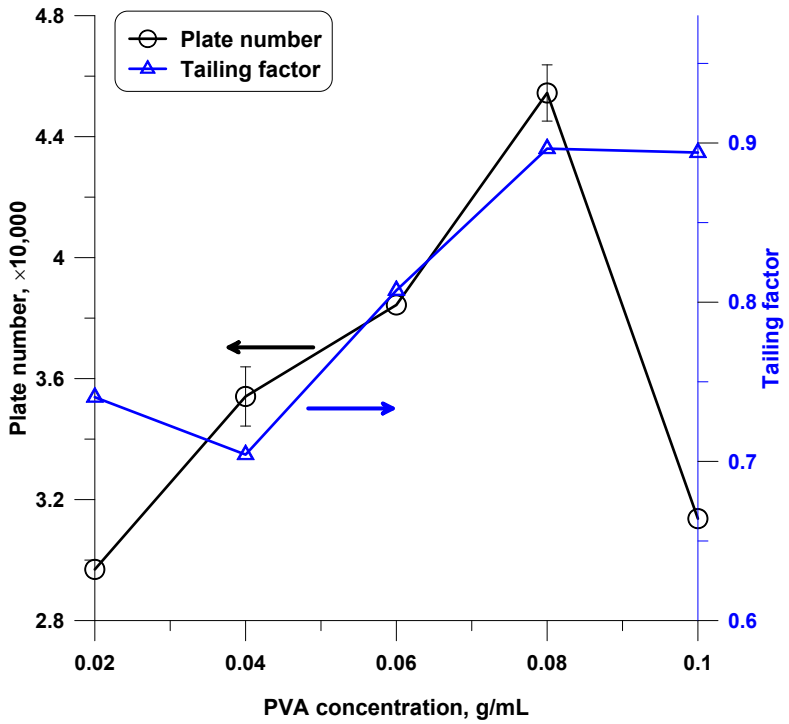
phthalic acid



Scheme-1 Chemical structures of the analytes used for evaluation

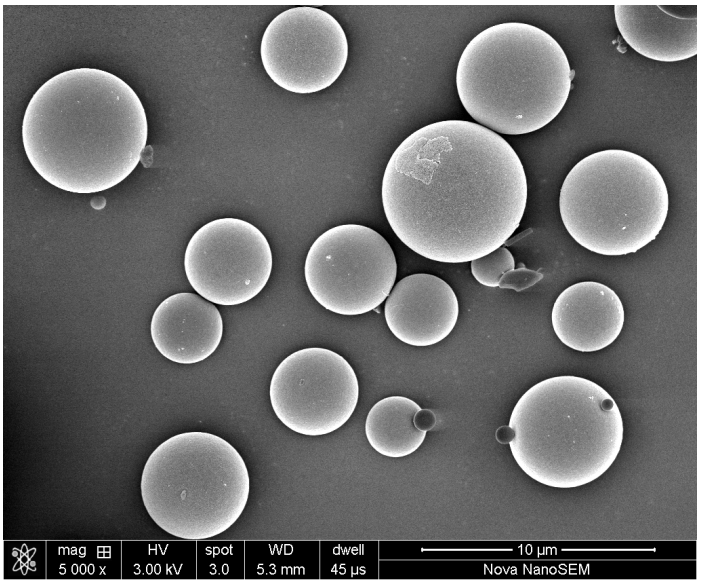
SI-Table 1. Summary of characterization data of the PVA-Sil and bare silica

Material	BET Surface Area (m^2/g)	Pore Volume (cm^3/g)	C%
Silica	360.89	0.87	<0.3%
PVA-Sil	289.15	0.78	2.47%

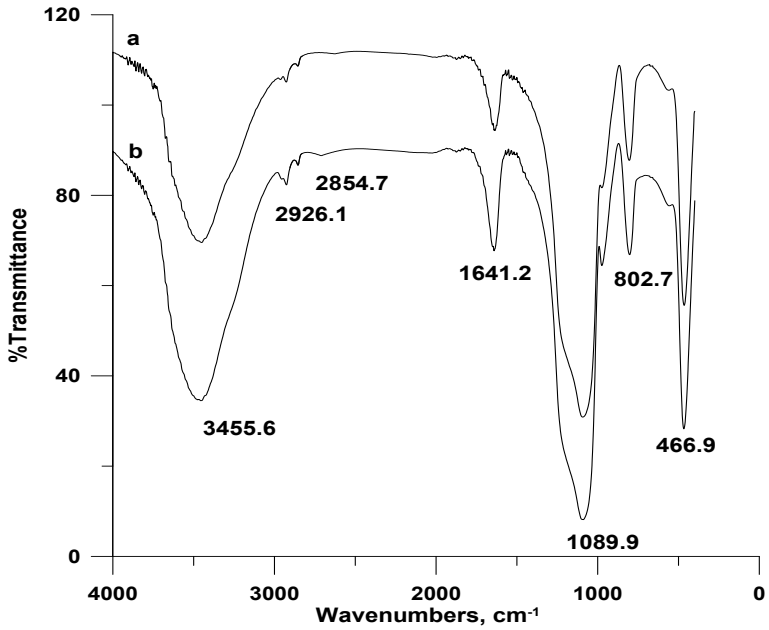


SI-Fig. 1 Effect of PVA solution concentration on the chromatographic performance.

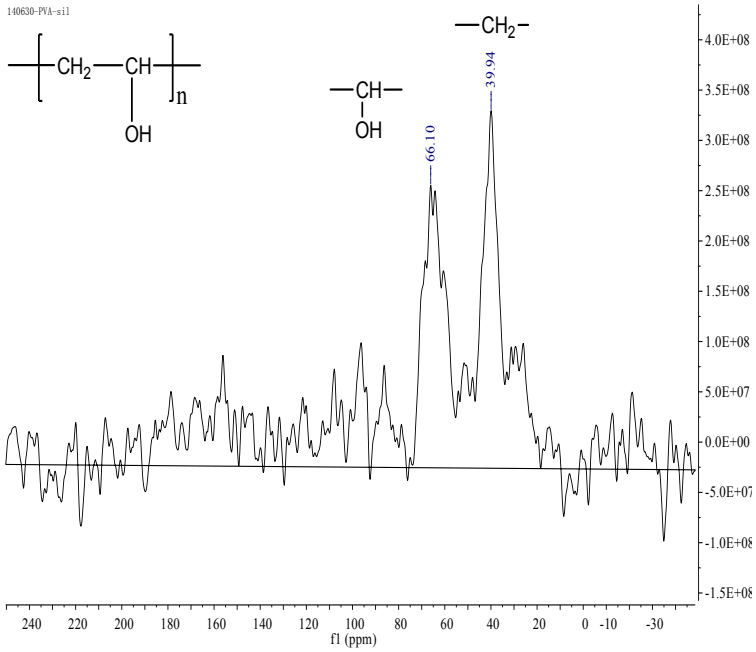
Conditions: mobile phase: A: ACN; B: H_2O; C: H_2O (250 mM NH_4FA, pH, 5.7), isocratic mode, 75%A/19% B/6% C; detection wavelength, 254 nm; flow rate, 1.0 mL/min; injection volume, 10 μL; column temperature, 30 ^oC; model analyte, cytosine.



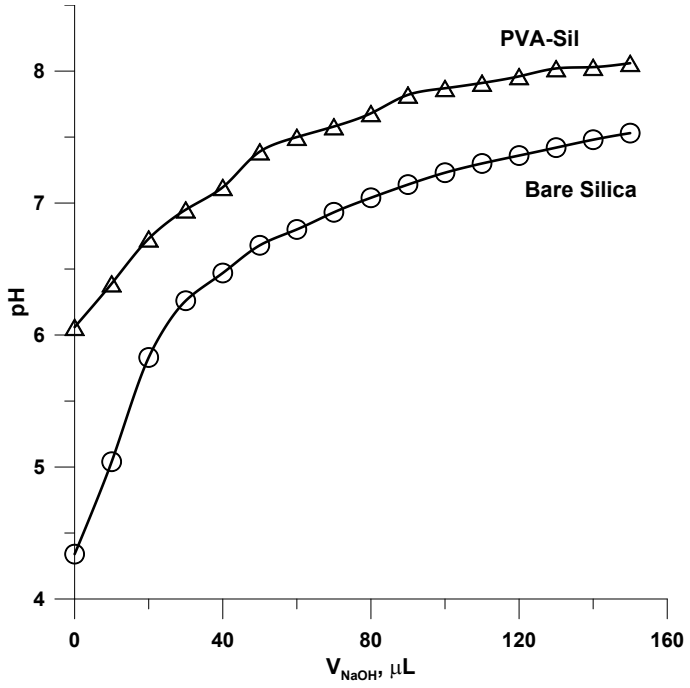
SI-Fig. 2 Scanning electron micrographs of PVA-Sil.



SI-Fig.3 IR spectra of bare silica (a) and PVA-sil (b).

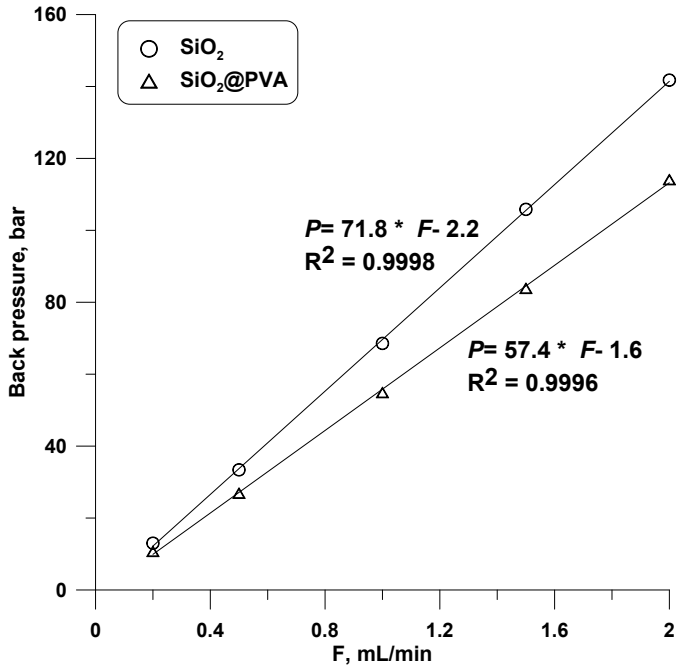


SI-Fig. 4 Solid phase ^{13}C-CP/MAS NMR spectrum of PVA-Sil stationary phase



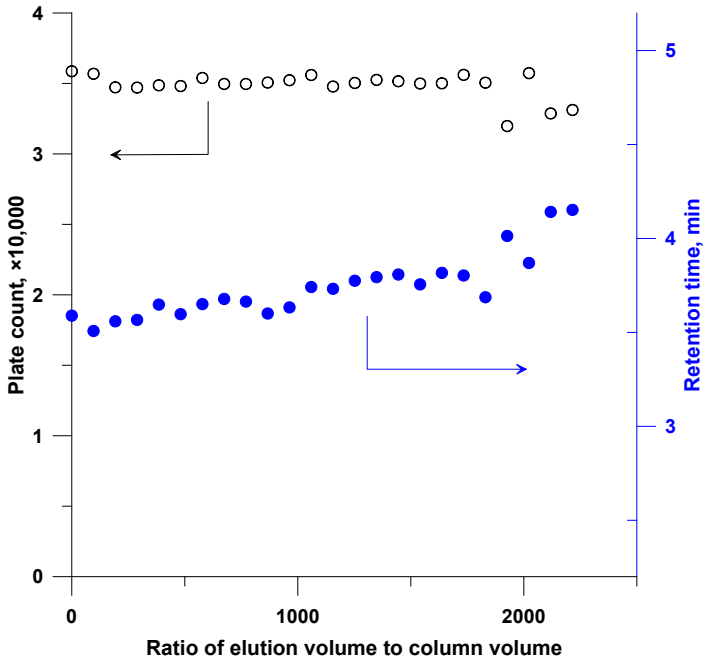
SI-Fig.5 Titration curve of bare silica and PVA-Sil.

Titration procedure: 0.3 g of silica or PVA-Sil was dissolved in 3 mL of pure water; the suspensions were titrated with addition of 10 μL standard NaOH solution (0.1 M) each time. Then the suspensions were shaked and measured by a pH meter.



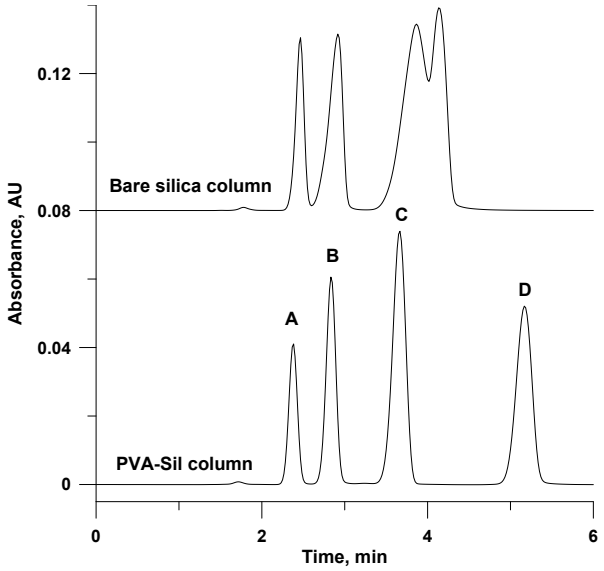
SI-Fig.6 Plot of back pressure vs linear velocity of mobile phase.

Conditions: mobile phase, pure water.

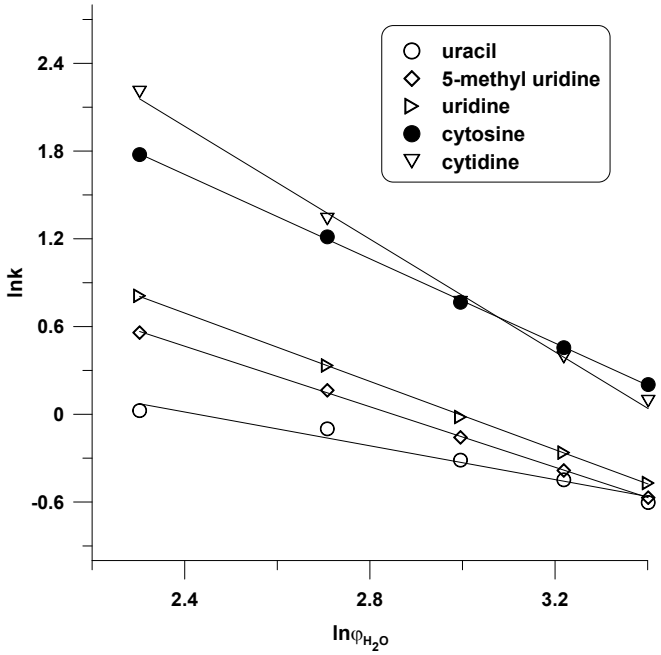


SI-Fig.7 Stability test of PVA-Sil column at extreme pH value (pH 11).

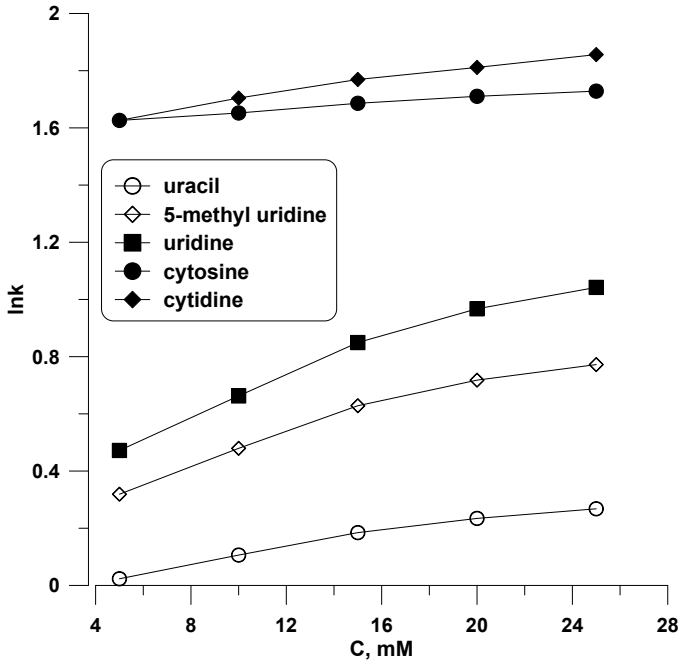
Conditions: mobile phase: ACN/triethylamine (v/v=90/10).



SI-Fig.8 Separation of small molecular acids on bare silica and PVA-Sil. Conditions: mobile phase: A: ACN; B: H_2O; C: H_2O (250 mM NH_4FA, pH, 3.15). 90% A/4% B/6% C; other conditions same to Fig. 3. Peak identification: A, sorbic acid, B, salicylic acid, C, acetyl salicylic acid, D, phthalic acid.

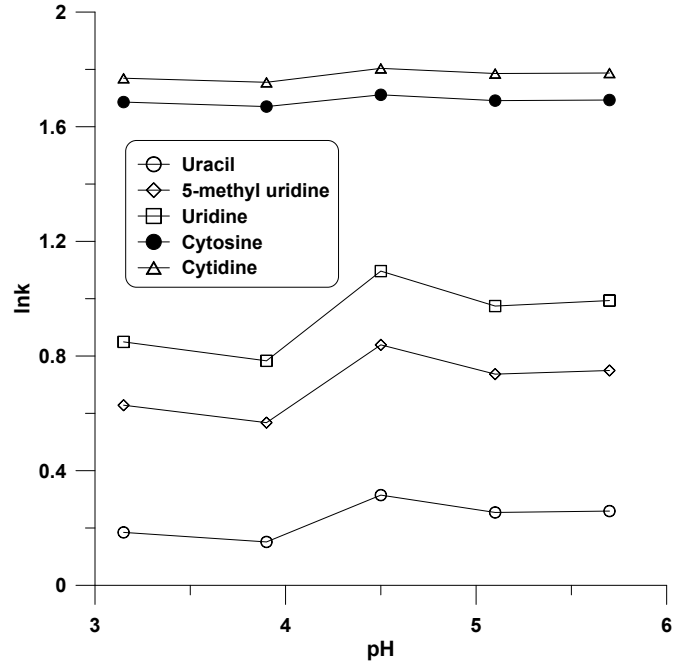


SI-Fig. 9 Plots of lnk & logarithm of the volume fraction of water in the mobile phase. Conditions same to Fig. 3.



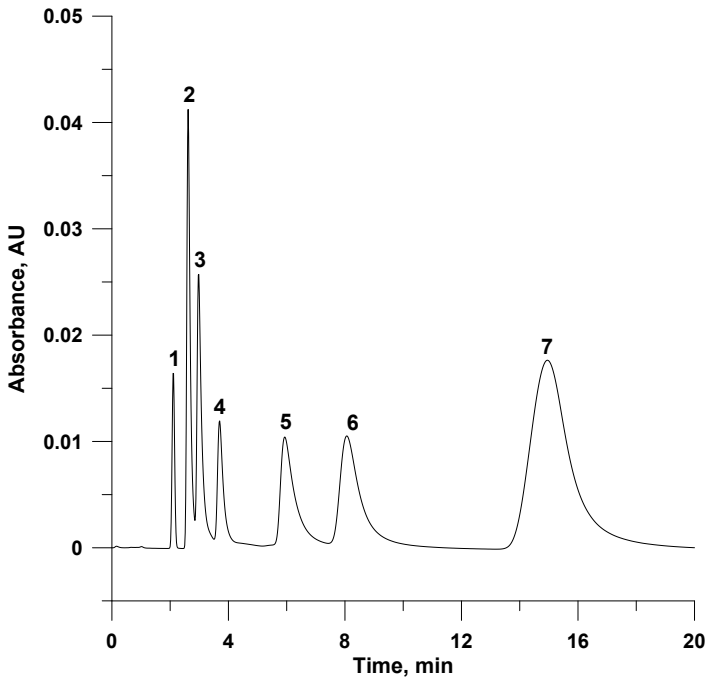
SI-Fig.10 Effect of salt concentration in the mobile phase on retention.

Conditions same to Fig. 4.

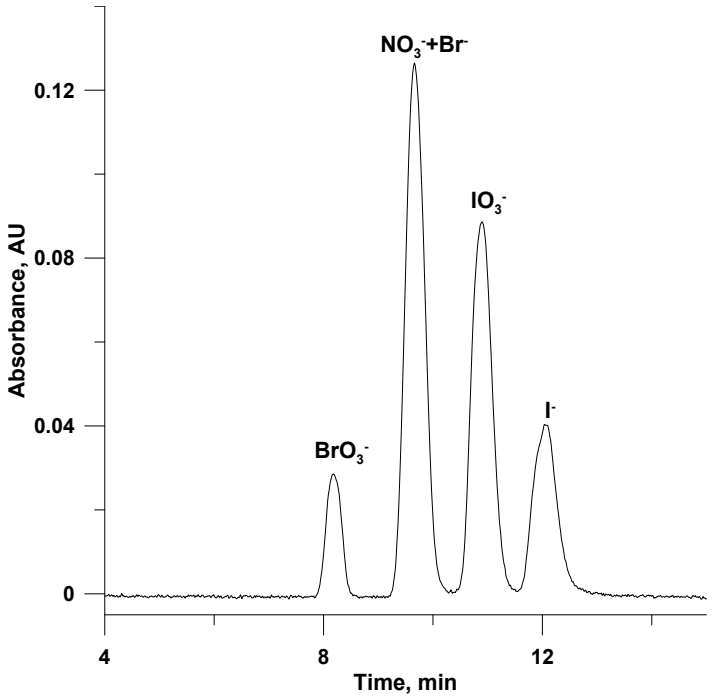


SI-Fig. 11 Effect of pH value of the mobile phase on retention.

Chromatographic conditions: mobile phase with pH value varying from 3.1 to 5.7 and other conditions same to Fig.4.



SI-Fig. 12 Separation of polycyclic aromatic hydrocarbons on PVA-SDS column. Conditions: column size, 4.6 mm i.d.× 150 mm length, 5 μm dia.; mobile phase, MeOH/ H_2O (v/v=20/80); flow rate, 1 mL/min; column temperature, 30 °C; injection volume, 10 μL; detection wavelength, 254 nm; peak identification, 1, uracil; 2, benzene; 3, toluene; 4, naphthalene; 5, biphenyl; 6, phenanthrene; 7, pyrene.



SI-Fig. 13 Separation of inorganic anions on PVA-PEI column

Conditions: column size, 4.6 mm i.d.× 150 mm length, 5 μm dia.; mobile phase, 2 mM NaCl; flow rate, 1 mL/min; column temperature, 30 °C; injection volume, 10 μL; detection wavelength, 210 nm.