

**In-situ photoinitiated fabrication of phosphorylcholine
functionalized polyhedral oligomeric silsesquioxane hybrid
monolithic column for mixed-mode capillary
electrochromatography**

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Fig. S1. Pore size distribution curve of column B measured by mercury intrusion porosimetry.

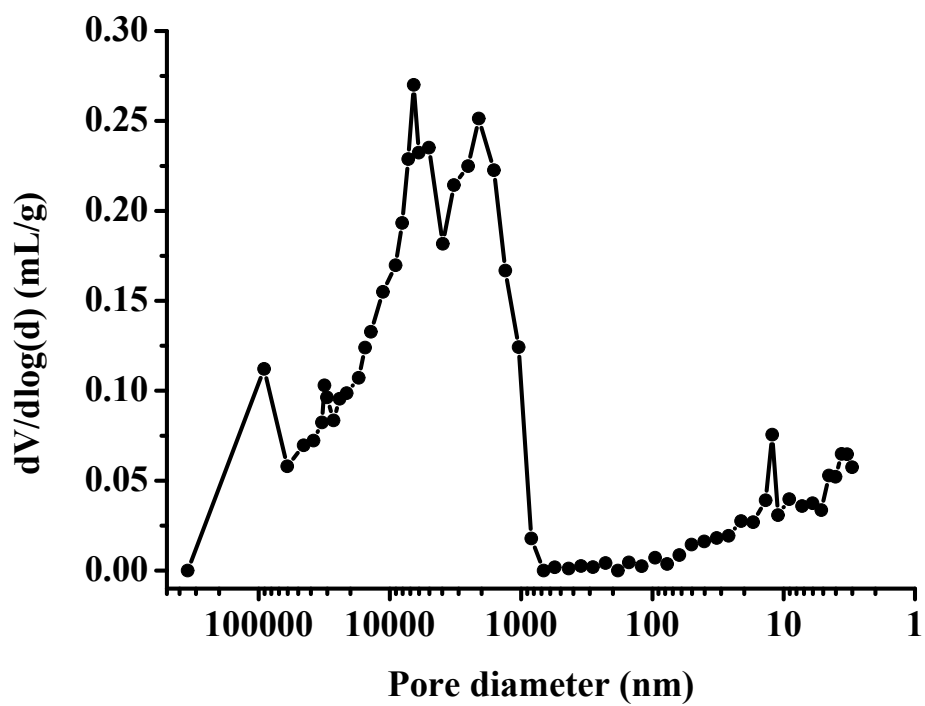


Fig. S2. The TGA curve of poly(POSS-co-MPC) hybrid monolithic column.

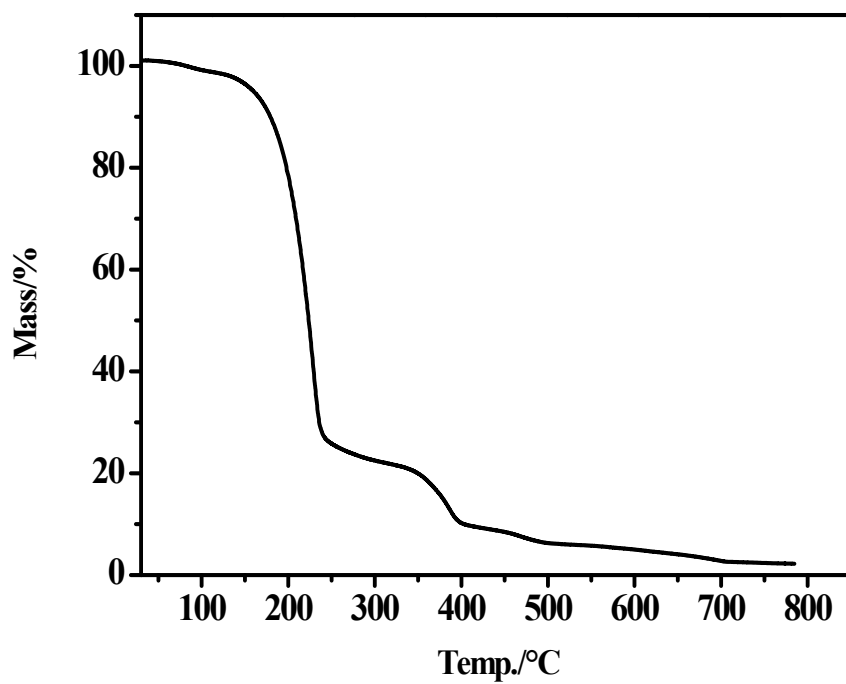


Fig. S3. Effects of the chromatographic conditions on the separation of nucleic acid bases. CEC conditions: mobile phase, (A) 10 mmol/L TEAP buffer (pH 3) with different content of ACN; (B) TEAP buffer (pH 3) containing 90% (v/v) ACN with buffer concentrations ranging from 5 to 20 mmol/L; (C) 10 mmol/L TEAP buffer containing 90% (v/v) ACN with different pH values; separation voltage, -18 kV; supplementary pressure, 250 psi; pump flow rate, 0.05 mL min⁻¹; detection wavelength, 254 nm.

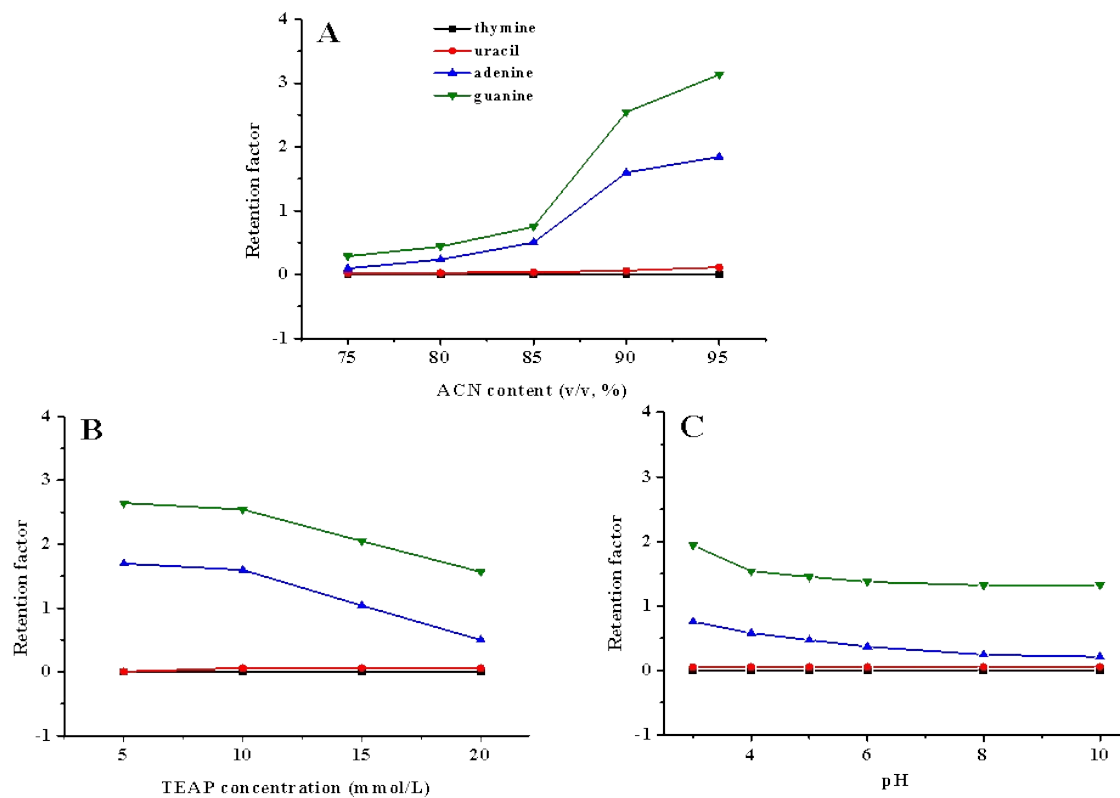


Fig. S4. Effects of the chromatographic conditions on the separation of nucleosides. CEC conditions: mobile phase, (A) 10 mmol/L TEAP buffer (pH 3) with different content of ACN; (B) TEAP buffer (pH 3) containing 90% (v/v) ACN with buffer concentrations ranging from 5 to 25 mmol/L; (C) 10 mmol/L TEAP buffer containing 90% (v/v) ACN with different pH values; separation voltage, -12 kV; supplementary pressure, 250 psi; pump flow rate, 0.05 mL min⁻¹; detection wavelength, 254 nm.

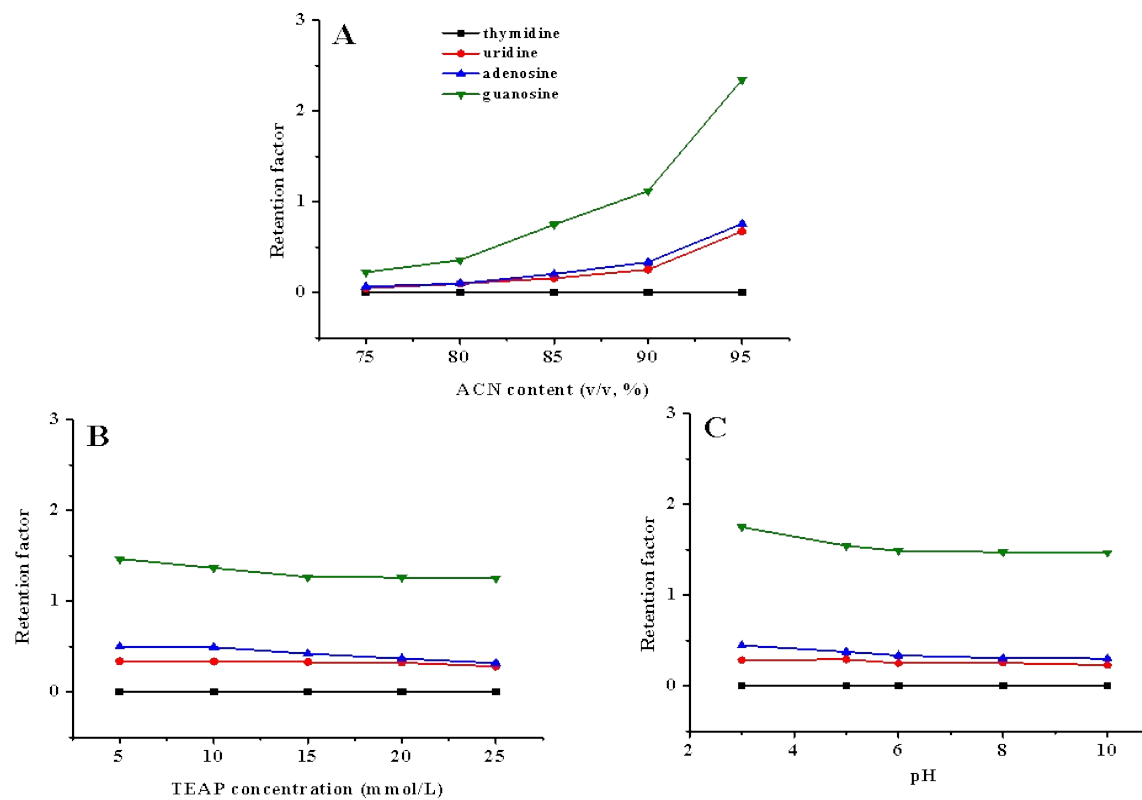


Fig. S5. Effects of the chromatographic conditions on the separation of benzoic acid derivatives. CEC conditions: mobile phase, (A) 10 mmol/L TEAP buffer (pH 3) with different content of ACN; (B) TEAP buffer (pH 3) containing 90% (v/v) ACN with buffer concentrations ranging from 5 to 25 mmol/L; (C) 10 mmol/L TEAP buffer containing 90% (v/v) ACN with different pH values; separation voltage, -12 kV; supplementary pressure, 500 psi; pump flow rate, 0.05 mL min⁻¹; detection wavelength, 214 nm.

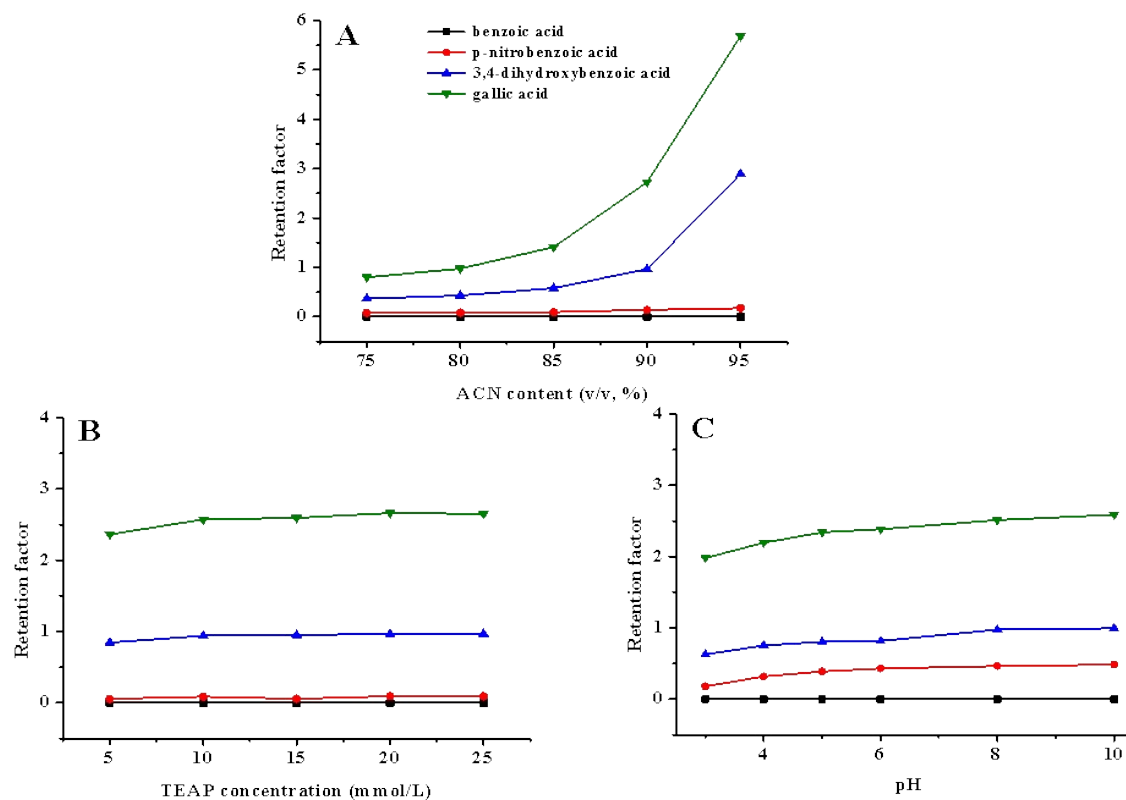


Fig. S6. Chromatogram on the poly(POSS-co-MPC) hybrid column for the separation of polypeptide antibiotics in spiked milk sample. CEC conditions: mobile phase, 50% ACN/10 mmol/L TEAP buffer (pH 3); separation voltage, -10 kV; supplementary pressure, 100 psi; pump flow rate, 0.05 mL min⁻¹; detection wavelength, 214 nm; Order of peaks: 1, vancomycin; 2, teicoplanin; 3, bacitracin; 4, polymyxin B

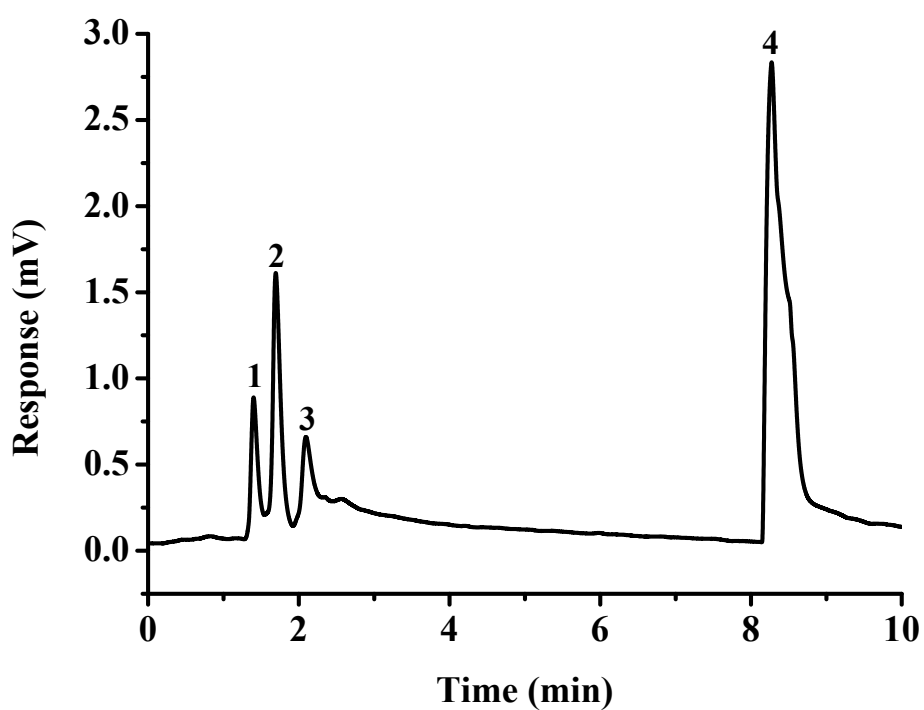


Table S1 Performance comparison of different POSS-based monolithic columns.

Stationary phases	Detection method	Monolith preparation	Retention mechanisms	Analytes	Column efficiency	Ref.
POSS-VDI	HPLC-UV	Thermal initiation 60 °C/ 12 h	AEX ^a /RPLC	Alkylbenzenes, thioureas, Fangji, Root of Kudzu Vine, egg white	109,000 N/m for alkylbenzenes	48
poly(POSS-co-META-co-DMMSA)	CEC-UV	Thermal initiation 85 °C/ 10 min	HILIC/IEX ^b	Nucleosides, bases, benzoic acids, glycopeptides	118,000 plates/m for thiourea	38
poly(POSS-co-TAPA)	cLC-UV/LC-MS	Photo initiation 30 min	RPLC	Phenolic, anilines, antibiotics mixtures, tryptic digest of HeLa cells	40,773 N/m for benzene	49
POSS-AVI-AG	HPLC-UV	Thermal initiation 60 °C/ 12 h	RPLC/HILIC	Phenols, alkylbenzenes, aromatic amines, thioureas, nucleosides/nucleic, bases and amides	571,000 plates/m for amides	29
poly(DMABS-co-POSS)	HPLC-UV	Thermal initiation 60 °C/ 12 h 70 °C/ 6 h	HILIC	nucleosides, bases, phenols, aromatic acids, amides	208,000 plates/m for thiourea	37

poly(POSS-co-MPC)	CEC-UV	Photo initiation 8 min	HILIC/WCX	amides, nucleobases, nucleosides, benzoic acids, antibiotics	93,500 plates/m for thiourea	This work
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a: Anion exchange.

b: Ion-exchange.