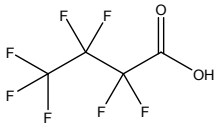
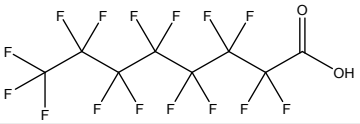
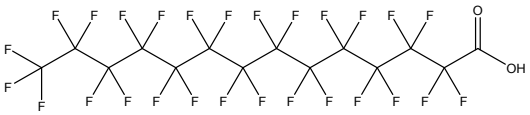
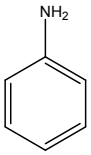
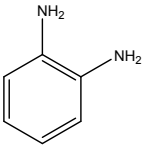
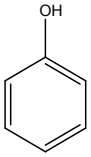
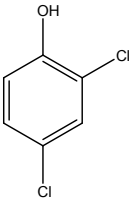
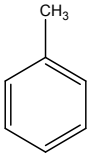
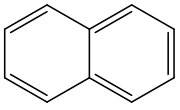
Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information

Section S1:

Table S1. Nine analytes with their molecular structures, pKa and Log D

No.	compounds	molecular structure	pKa	Log D (pH 7)
1	heptafluorobutyric acid (F4)		0.37	-0.36
2	pentadecafluorooctanoic acid (F8)		0.50	2.69
3	perfluorotetradecanoic acid (F14)		0.52	7.07
4	aniline		4.61	1.14
5	1,2-diaminobenzene (1,2-DAB)		4.46	0.24
6	phenol		9.86	1.54
7	2,4-dichlorophenol (2,4-DCP)		8.05	3.10
8	toluene		\	2.72
9	naphthalene		\	3.36

Note: the pKa and Log D values are collected from SciFinder predicted properties.

Section S2:

The results of SPE procedure optimization have been shown in Figure S1.

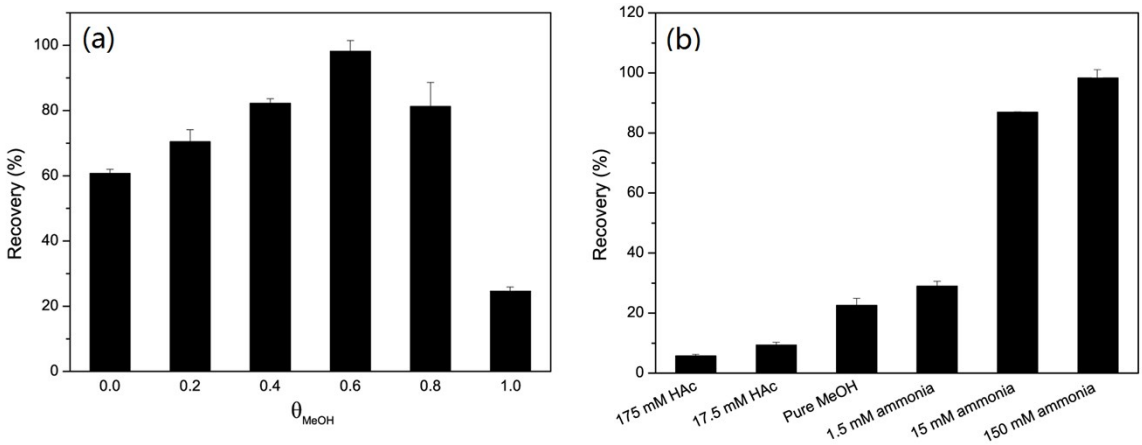


Figure S1. Effect on the elution efficiency. (a) Effect of the concentration of methanol; (b) Effect of the acid-base properties of elution solvents.

Section S3:

Procedure of ninhydrin assay was introduced in details as below.

The ninhydrin assay was applied to determine the silica surface density of amino groups [1]. Both 0.35% (w/v) ninhydrin solution and standard APTMS solutions with the concentration range from 0.1 to 0.7 mM were freshly prepared in absolute ethanol NH_2-silica samples were dried at 60 °C for 4−6 h, and then 0.003 g of sample was dispersed with 2 mL of absolute ethanol. The mixture was ultrasonicated for 20 min. Next, 0.5 mL of ninhydrin solution was added to the mixture and it was ultrasonicated for 10 more minutes. The ninhydrin-sample dispersion was then placed in a water bath at 65 °C for 30 min. The samples were allowed to cool down at room temperature for 10−15 min, and then centrifuged to obtain the supernatant. The absorbance of the supernatant at 588 nm was measured in an Agilent Cary 60 spectrophotometer. Measurements were repeated three times.

Reference

[1] E. Soto-Cantu, R. Cueto, J. Koch and P. S. Russo, *Langmuir*, 2012, **28**, 5562-5569.