Electronic Supplementary Information

Enantioselective open-tubular capillary electrochromatography using β-cyclodextrin-gold nanoparticles-polydopamine coating as stationary phase

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Table S1. Effects of the concentration of SH-β-CD on the resolution (Rs) and selectivity (α) of seven enantiomers [a].

Analyte	1.5 mg/mL		2.5 mg/mL		3.5 mg/mL	
	Rs	α	Rs	α	Rs	α
Tryptophan	1.18	1.05	2.20	1.07	NS [b]	-
Phenylalanine	1.84	1.10	2.76	1.12	2.71	1.09
Histidine	1.82	1.10	2.19	1.12	NS	-
Fexofenadine	NS	-	1.43	1.04	NS	-
Promethazine	1.21	1.03	2.64	1.16	NS	-
Tropicamide	NS	-	1.51	1.04	0.65	1.01
Terbutaline	NS	-	1.37	1.04	NS	-

[a] Conditions: their respective separation conditions were listed in Tab. S2

[b] No separation

Table S2. The respective optimum enantioseparation conditions of seven pairs of enantiomers.

Analyte	pH	Methanol (v/v)	Buffer (mM)
Tryptophan	8.5	20%	20.0[a]
Phenylalanine	8.5	20%	15.0[a]
Histidine	8.5	20%	15.0[a]
Fexofenadine	8.5	5%	15.0[a]
Promethazine	9.5	20%	10.0[b]
Tropicamide	9.5	15%	15.0[b]
Terbutaline	10.0	20%	20.0[b]

Experimental conditions: columns, 50 μm id, 49.6 cm total length (effective length, 39.7 cm); Applied voltage: 20 kV; [a] Tris-H_3PO_4 buffer; [b] phosphate buffer

Table S3. Comparison with other cyclodextrins modified open tubular columns in CEC enantioseparation

Coating material	Column preparation method	Analyte	Analysis time	Resolution	Reference
β-CD/PDA	Polymerization reaction; CD immobilization through the adhesion of PDA	Epinephrine, Norepinephrine, Isoprenaline, Terbutaline, Tryptophane, Verapamil, Carvedilol	Within 13 min	Four of seven enantiomers with baseline separation	[23]
cationic-β-CD polymer/ poly(sodium 4-styrenesulfonate)	Electrostatic adsorption	Warfarin, 2,2′-diamino-1,1′-binaphthyl, 1,1′-binaphthalene-2,2′-diylhydrogen phosphate, 2,2′-dihydroxy-1,1′-binaphthyl, 5-(4-hydroxyphenyl)-5-phenylhydantoin, labetalol, ketoprofen, Ibuprofen, fenoprofen, acenocoumarol, bendroflumethiazide, 7-methoxy-flavanone	Not mentioned	Three of twelve enantiomers with baseline separation	[30]
SH-β-CD modified AuNPs/poly(diallydimethylammonium chloride)	Electrostatic adsorption	Chlorpheniramine, zopiclone and tropicamide	Within 11 min	Two of three enantiomers with baseline separation	[16]
graphene oxide-magnetic nanocomposites/β-CD	*in situ* chemical deposition; adsorption through hydrogen bonding interaction	Tryptophan	Within 50 s	1.65	[31]
SH-β-CD/AuNPs/3-mercaptopropyl-trimethoxysilane	Covalently bonding	Meptazinol and its three intermediate enantiomers	Within 20 min	Three of four enantiomers with baseline separation	[17]
β-CD/periodic mesoporous	Covalently bonding	Leucine and proline	Within 30 min	Not mentioned	[32]

organosilica					
amidopropyltrimethylammonium chloride divinyl-benzene polymer bonded with HS-β-CD	Polymerization reaction; electrostatic interaction	A racemic mixture of aspartic acid, tyrosine and lysine	Within 7 min	Not mentioned	[33]
SH-β-CD/AuNPs/PDA	Polymerization reaction; electrostatic adsorption; covalently bonding	Tryptophan, phenylalanine, histidine, fexofenadine, promethazine, tropicamide and tebutaline	Within 15 min	Five of seven enantiomers with baseline separation	This work

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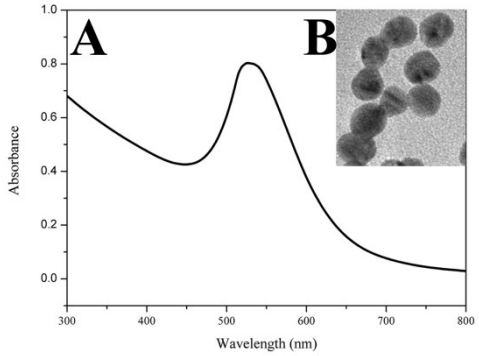

Figure S1. (A) UV-vis absorption spectrum of AuNPs dispersed in water. λmax=521 nm; (B) TEM micrograph (200 kV×100.0 K magnification) of AuNPs dispersed in water

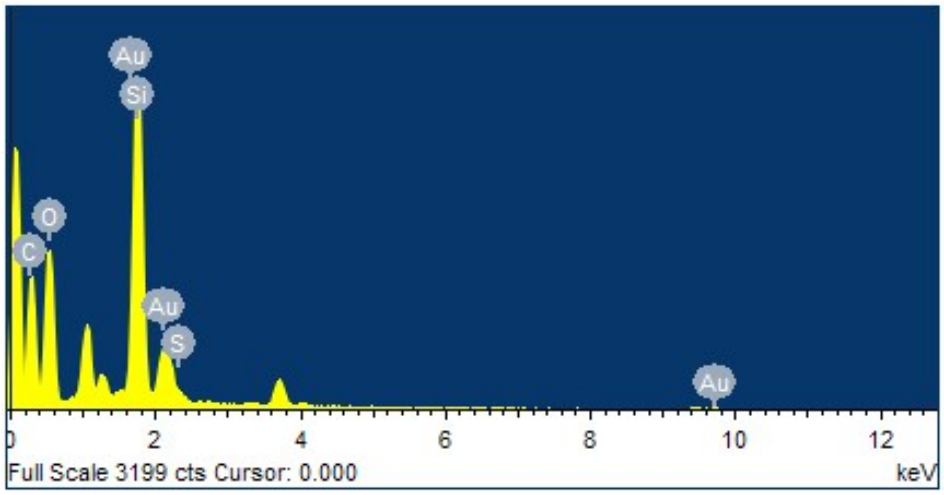

Figure S2. Energy dispersive X-ray analysis spectrum

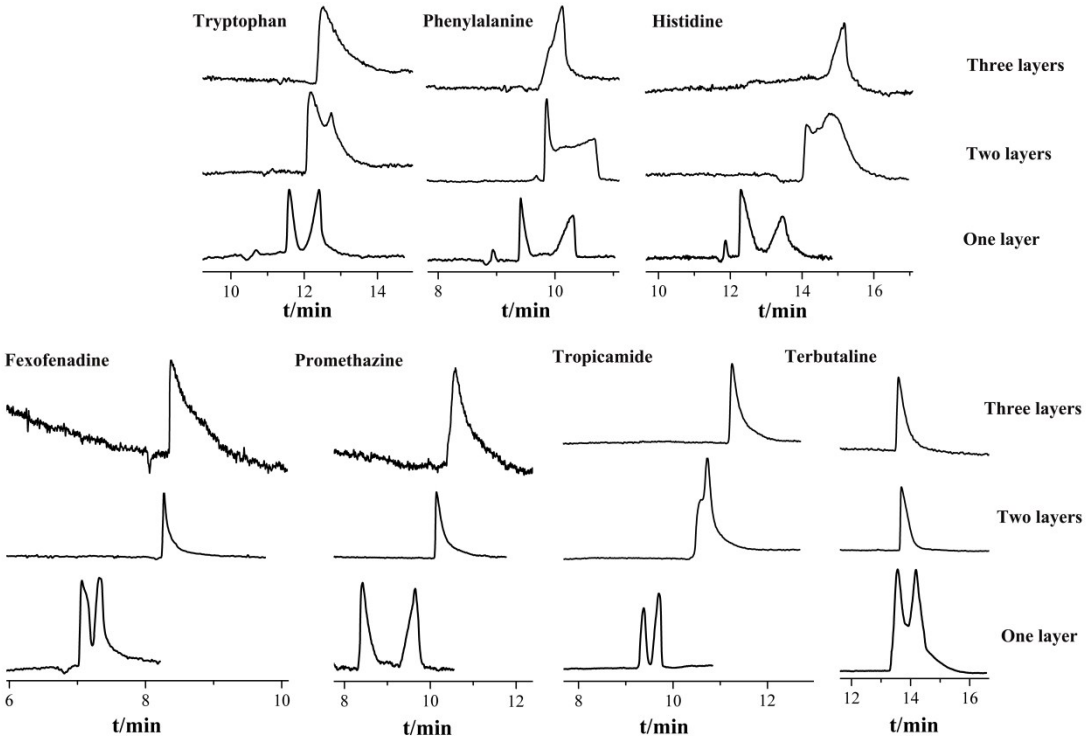

Figure S3. Electropherograms of enantioselective OTCEC separation of seven chiral drugs using one-layer, two-layer and three-layer AuNPs immobilized capillary columns

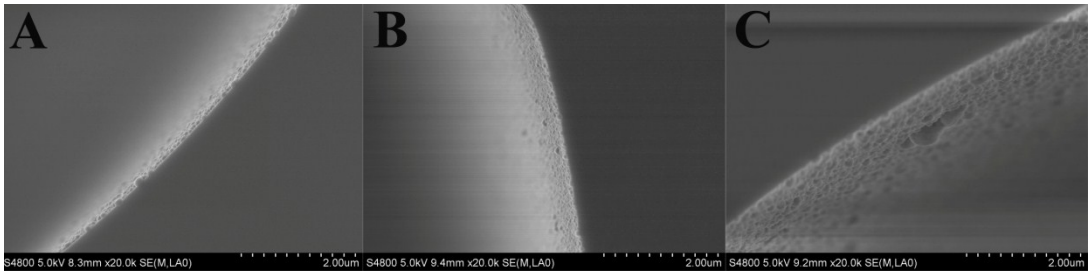

Figure S4. SEM images of (A) one-layer AuNPs modified capillary column, (B) two-layer AuNPs modified capillary column, (C) three-layer AuNPs modified capillary column (20000 times magnification)

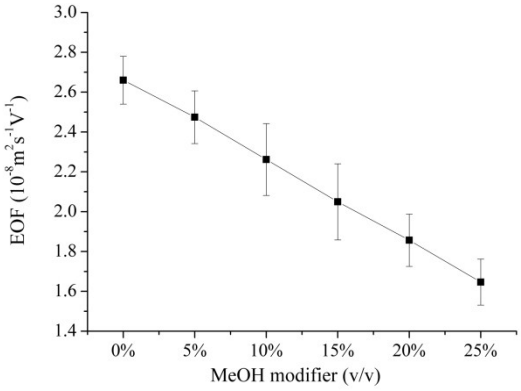

Figure S5. Influence of methanol content on the EOF mobility in β-CD-AuNPs-PDA@capillary. Experimental conditions: 20 mM phosphate buffer, pH 9.5, 20 kV.

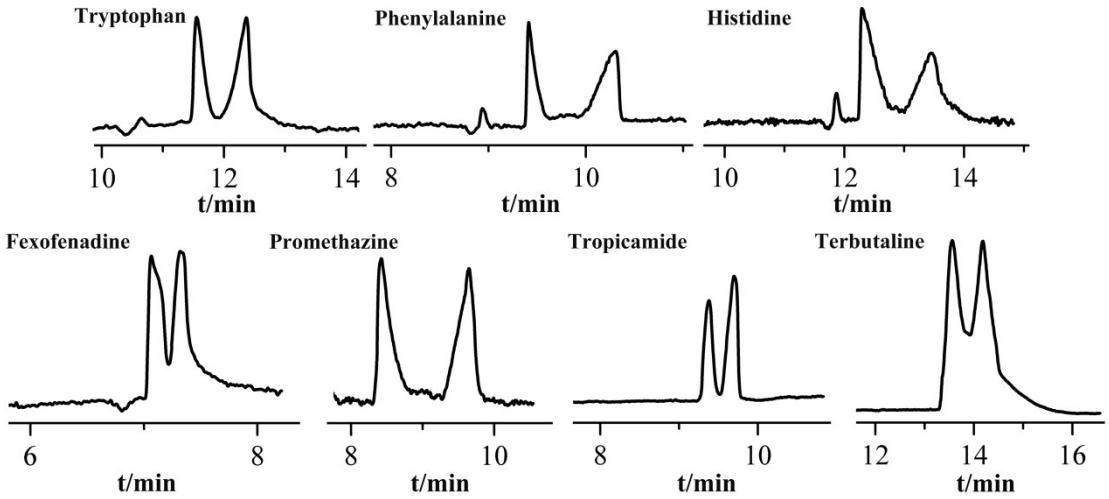

Figure S6. Typical electropherograms of seven chiral drugs. Experimental conditions: their respective separation conditions were listed in Tab. S2