Supplementary data

Polydopamine-assisted rapid one-step immobilization of L-arginine in capillary as immobilized chiral ligands for enantioseparation of dansyl amino acids by chiral ligand exchange capillary electrochromatography

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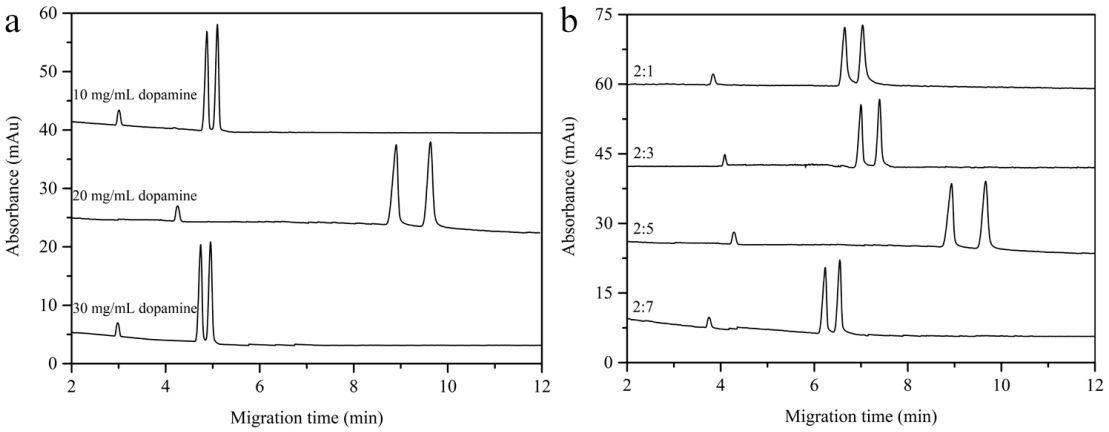

Figure S1. (a) Electropherograms of Dns-D, L-Ala on PDA/L-Arg@capillary fabricated by using 250 mM L-Arg and different concentrations of dopamine. (b) Electropherograms of Dns-D, L-Ala on PDA/L-Arg@capillary fabricated by using different molar ratio of dopamine to L-Arg. All conditions are the same as Figure 5.

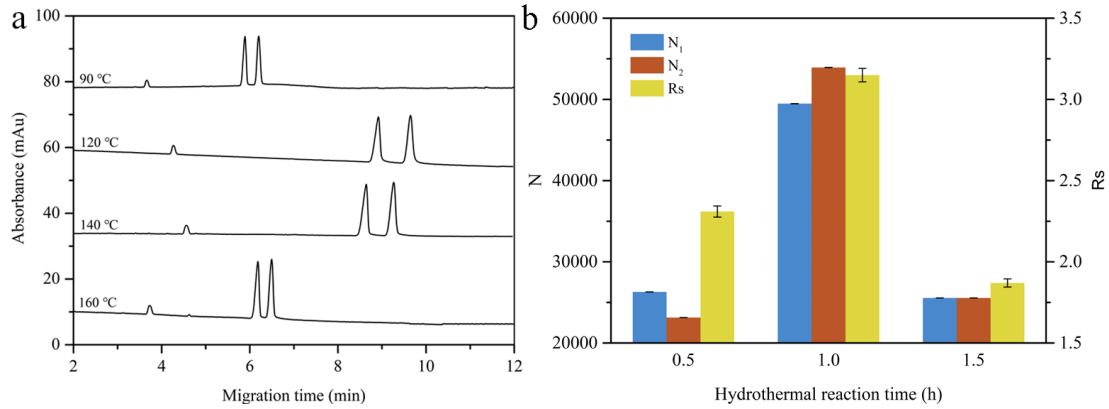

Figure S2. (a) Electropherograms of Dns-D, L-Ala on PDA/L-Arg@capillary fabricated under different reaction temperature. (b) Influence of hydrothermal reaction time on the resolutions and theoretical plate numbers of Dns-D, L-Ala. All the CE experimental conditions are the same as Figure 5.

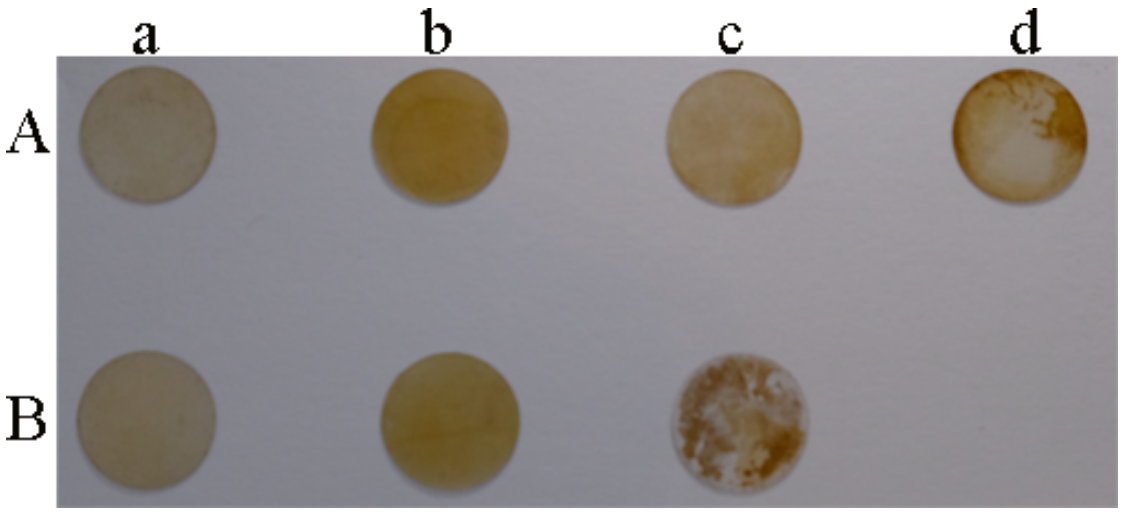

Figure S3. (A) Digital photographs of PDA/L-Arg coated quartz plates fabricated under reaction time of 1 h with different reaction temperature of 90 °C (a), 120 °C (b), 140 °C (c), 160 °C (d). (B) Digital photographs of PDA/L-Arg coated quartz plates fabricated under 120 °C with different reaction times of 30 min (a), 1 h (b), 1.5 h (c).

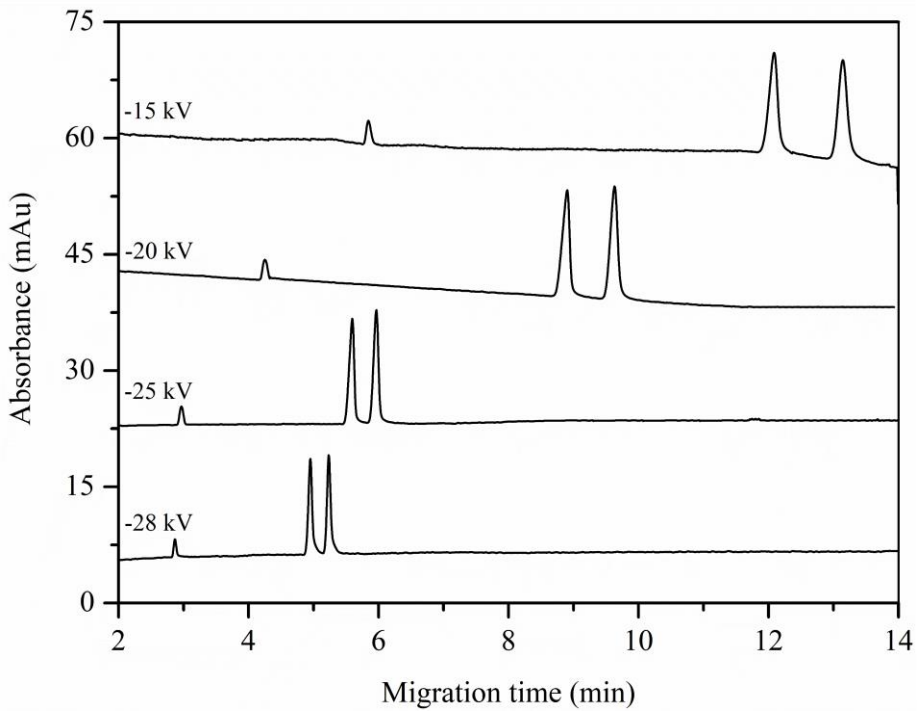

Figure S4. Electropherograms of Dns-D, L-Ala on PDA/L-Arg@capillary at different voltages ranged from -15.0 kV to -28.0 kV. All the CE experimental conditions are the same as Figure 5.

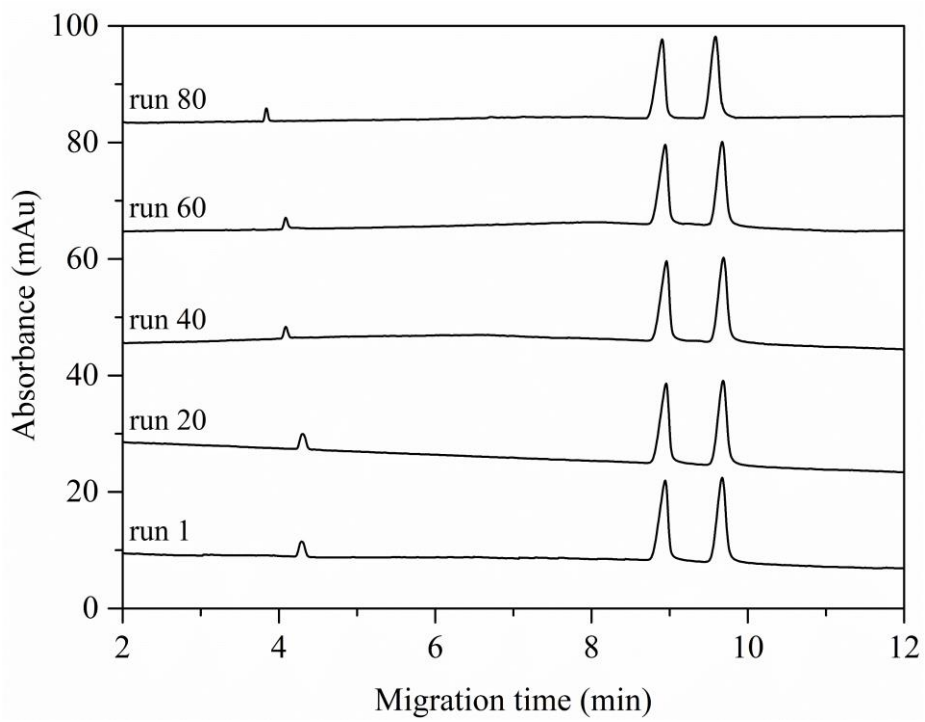

Figure S5. Electropherograms of Dns-D, L-Ala after 80 consecutive runs on PDA/L-Arg@capillary. All the CE experimental conditions are the same as Figure 5.

Table S1. Enantioseparation performances of Dns-D, L-AAs with PDA/L-Arg@capillary and bare capillary.

Dns-D, L-AAs	**[a] Bare capillary**			**[b] PDA/L-Arg@capillary**		
Dns-D, L-AAs	**[c] Rs**	**[d] t_D / min**	**[e] t_L / min**	**[c] Rs**	**[d] t_D / min**	**[e] t_L / min**
Dns-D,L-Asp	0.74±0.09	4.05±0.10	4.18±0.20	3.16±0.10	8.91±0.10	9.34±0.10
Dns-D,L-Ala	1.22±0.03	4.87±0.06	5.05±0.10	3.15±0.03	6.93±0.30	7.33±0.07
Dns-D,L-Ser	1.54± 0.04	4.63±0.71	4.92±0.50	5.28±0.04	8.23±0.04	9.03±0.07
Dns-D,L-Gln	0.66±0.04	4.71±0.53	4.85±0.47	2.98±0.05	7.51±0.09	7.96±0.20
Dns-D,L-Met	1.29±0.02	4.98±0.80	5.19±0.39	3.14±0.20	7.57±1.20	8.20±0.20
Dns-D,L-Ile	1.03±0.01	4.45±0.70	4.56±0.80	2.39±0.03	6.99±0.80	7.34±0.20
Dns-D,L-Asn	1.47±0.04	5.22±0.45	5.41±0.60	2.16±0.05	10.02±0.08	10.68±0.15
Dns-D,L-Thr	0.75±0.03	4.30±0.5	4.38±0.09	1.82±0.01	6.44±0.06	6.74±0.08
Dns-D,L-Leu	0.39±0.01	4.34±0.09	4.38±0.08	1.07±0.09	6.21±0.20	6.38±0.10
Dns-D,L-Pro	0	2.98±0.10	2.98±0.10	0.78±0.10	5.24±0.40	5.38±0.65
Dns-D,L-Phe	0	4.69±0.07	4.69±0.07	0.66±0.10	7.12±0.30	7.27±0.20

[a] CLE-CEC conditions were same as that in Figure 5 with PDA/L-Arg@capillary;

[b] CLE-CE conditions were same as that in Figure 5 with bare capillary;

[c] chiral resolution of Dns-D, L-AAs;

[d] migration time of Dns-D-AAs;

[e] migration time of Dns-L-AAs.

Table S2. Comparison with enantioseparation of D, L-AAs using different CLE-CEC systems.

No.	Types of Capillary	fabrication time	Organic solvent	Rs>1.5	Rs<1.5	migration time	Reference
1	Continuous bed capillary	>12 h	No	2 pairs	7 pairs	7-27 min	[34]
2	Silica monolithic capillary	>2 days	70% ACN	12 pairs	-*	5-16 min	[33]
3	Silica monolithic capillary	>1 week	70% ACN	2 pairs	2 pairs	22-24 min	[24]
4	Coated capillary	>4 days	No	5 pairs	5 pairs	6-22 min	[8]
5	Coated capillary	>2 days	No	7 pairs	5 pairs	20-67 min	[7]
6	Coated capillary	1 h	No	8 pairs	3 pairs	5-11 min	This study

*Not mentioned

Table S3. Relative standard deviations (RSD%) of the retention time of Dns-D, L-AAs in intra-day and inter-day and column-to-column. [a]

Dns-D,L-AAs	Intra-day (n=5)		Inter-day (n=3)		column-to-column (n=3)	
	RSD_{t_1} [b]	RSD_{t_2} [c]	RSD_{t_1} [b]	RSD_{t_2} [c]	RSD_{t_1} [b]	RSD_{t_2} [c]
Dns-D,L-Asp	1.20	2.84	2.00	3.35	4.90	4.15
Dns-D,L-Ala	1.96	2.47	3.60	2.90	3.89	5.70
Dns-D,L-Ser	1.90	1.30	2.63	2.29	5.76	5.16

[a] CLE-CEC conditions were same as that in Figure 5

[b] migration time of Dns-D-AAs

[c] migration time of Dns-L-AAs

Table S4. Quantitative results of the CLE-CEC system for Dns-D-Glu and Dns-L-Glu. [a]

Dns-D,L-Glu	Linear relationship [b]	r^2	Linearity range (μg/mL)	LOD (μg/mL)	LOQ (μg/mL)
Dns-D-Glu	Y=0.0721*X+0.3375	0.9985	15-800	15	50
Dns-L-Glu	Y=0.0706*X+0.5172	0.9980	15-800	15	50

[a] CLE-CEC conditions were same as in Figure 5;

[b] Y represents corrected peak area; X represents the concentration of Dns-D-Glu or Dns-L-Glu.