

Supplementary material

Molecularly Imprinted Polypyrrole-Modified Screen-Printed Electrode for Dopamine Determination

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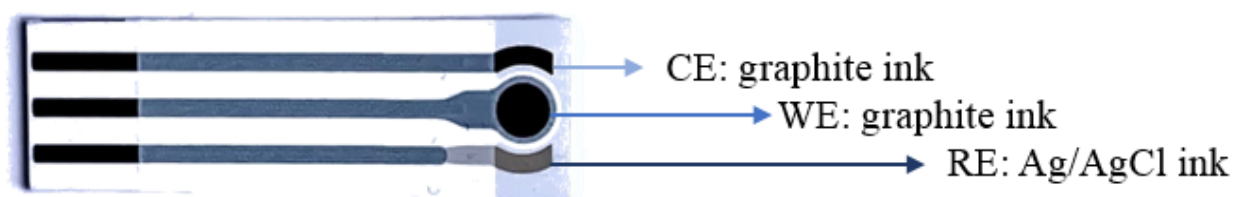


Figure S1. Picture of the screen-printed electrochemical cell

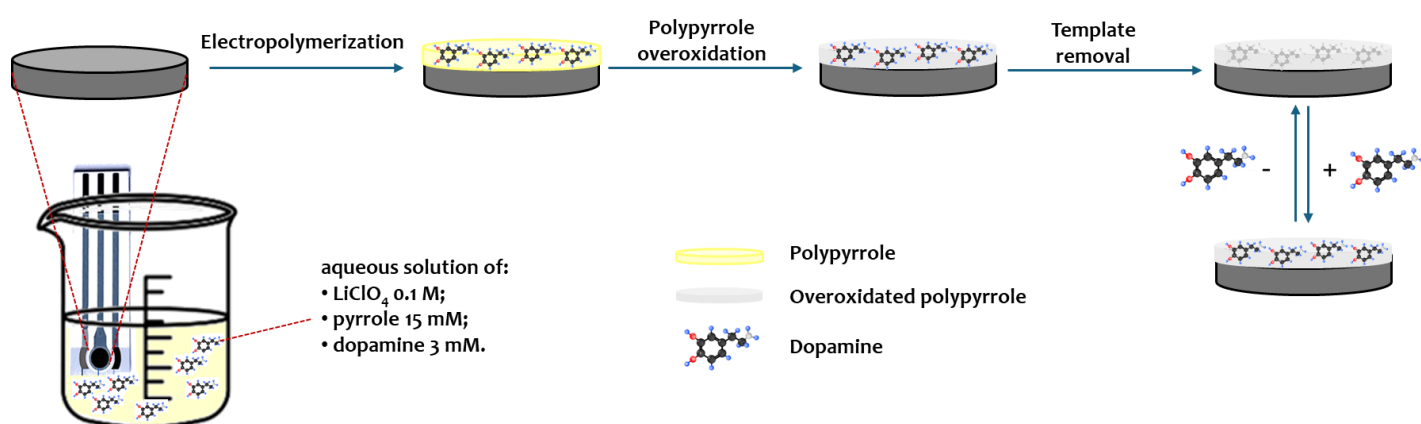


Figure S2. Scheme of the preparation of the e-MIP-modified electrode

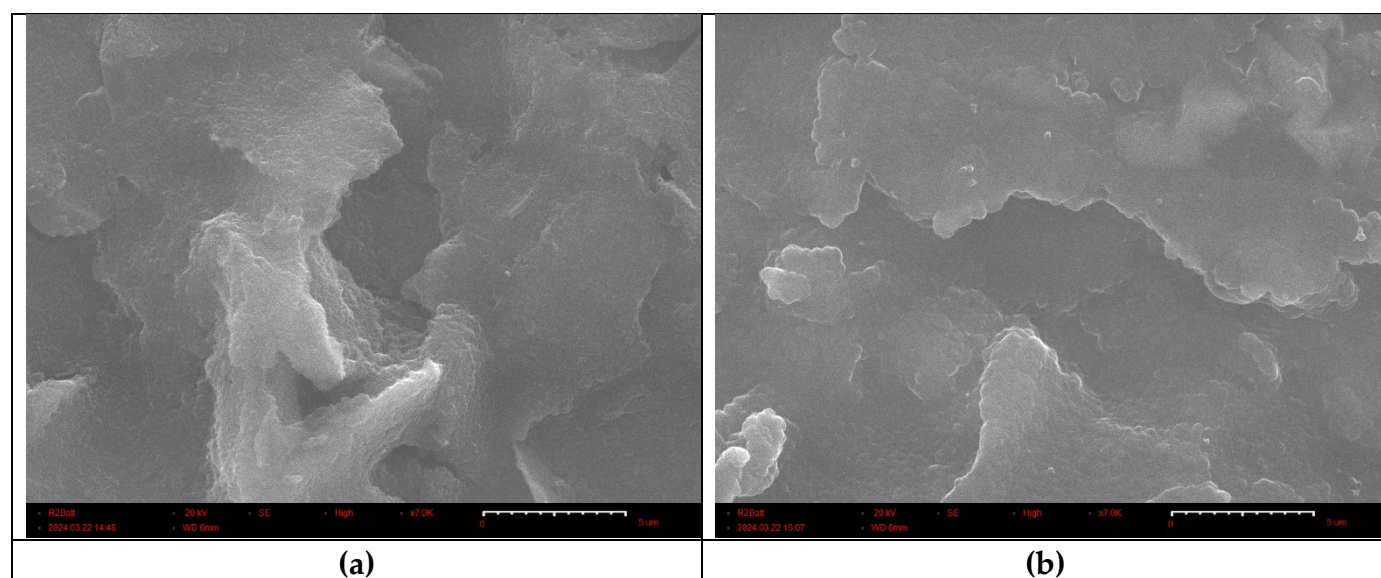


Figure S3. SEM images of (a) e-MIP-modified electrode and (b) e-NIP-modified electrode

Table S1. Randles equivalent circuits and component values used for the curve-fitting of the EIS Nyquist plots of Figure 4.

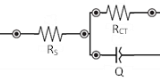
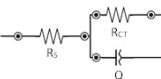
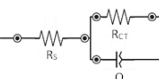
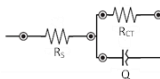
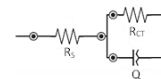
Bare electrode		e-MIP electrode after template removal		e-MIP electrode after equilibration with DA 20 μ M		e-MIP electrode before template removal		e-NIP electrode	
									
R_s / Ω	322.2	R_s / Ω	320	R_s / Ω	297	R_s / Ω	500	R_s / Ω	425
R_{CT} / Ω	8211	R_{CT} / Ω	$1.1 \cdot 10^4$	R_{CT} / Ω	$1.2 \cdot 10^4$	R_{CT} / Ω	$1.0 \cdot 10^4$	R_{CT} / Ω	$6.3 \cdot 10^4$
W / σ	900	W_s / σ $/ \sqrt{s}$ $/ \phi$	603 0.87 0.82	W_s / σ $/ \sqrt{s}$ $/ \phi$	150 0.004 0.7	W / σ	2068	W / σ	4500
Q / F	$1.3 \cdot 10^{-6}$	Q / F	$6.0 \cdot 10^{-5}$	Q / F	$6.1 \cdot 10^{-5}$	Q / F	$3.5 \cdot 10^{-5}$	Q / F	$8.2 \cdot 10^{-5}$
n / ϕ	0.93	n / ϕ	0.81	n / ϕ	0.82	n / ϕ	1	n / ϕ	1

Table S2. Peak potential and peak current values of the CV voltammograms registered at different scan speeds in PBS 0.1 M at pH 7 and DA 2.5 mM with the bare electrode (see Figure 6a)

Scan rate / Vs^{-1}	E_{pA} / V	E_{pC} / V	$I_{pA} / \mu A$	$ I_{pC} / \mu A$
0.01	0.19	0.08	21.09	9.25
0.02	0.21	0.08	24.73	9.22
0.03	0.22	0.08	25.38	10.78
0.04	0.23	0.07	26.94	12.12
0.05	0.23	0.07	30.65	13.76
0.06	0.25	0.06	32.42	15.05
0.08	0.27	0.06	38.34	18.10
0.1	0.29	0.05	40.61	21.47
0.2	0.32	0.03	60.39	38.32
0.3	0.35	0.01	68.50	54.53
0.4	0.37	-0.01	76.81	68.19
0.5	0.39	-0.02	88.00	81.91
0.6	0.40	-0.03	95.73	93.63
0.7	0.42	-0.05	102.5	105.7
0.8	0.43	-0.06	110.1	115.3
0.9	0.44	-0.07	116.1	124.9
1	0.46	-0.07	127.9	134.4

Table S3. Peak potential and peak current values of the CV voltammograms registered at different scan speeds in PBS 0.1 M at pH 7 and DA 2.5 mM with the e-MIP-modified electrode (see Figure 6b)

Scan rate /Vs ⁻¹	<i>E</i> _{pA} /V	<i>E</i> _{pC} /V	<i>I</i> _{pA} /μA	<i>I</i> _{pC} /μA
0.01	0.18	0.09	20.53	9.56
0.02	0.19	0.09	23.25	10.38
0.03	0.20	0.09	27.92	12.45
0.04	0.20	0.09	29.80	14.47
0.05	0.21	0.09	34.21	16.29
0.06	0.22	0.08	36.67	18.12
0.08	0.23	0.07	40.65	21.61
0.1	0.24	0.07	48.02	26.15
0.2	0.27	0.04	67.37	45.63
0.3	0.30	0.03	85.51	65.90
0.4	0.31	0.01	92.44	82.88
0.5	0.33	0.00	104.2	98.51
0.6	0.35	-0.02	116.6	113.1
0.7	0.36	-0.03	121.4	125.5
0.8	0.37	-0.04	128.4	136.6
0.9	0.38	-0.05	136.2	146.6
1	0.39	-0.06	144.1	156.2

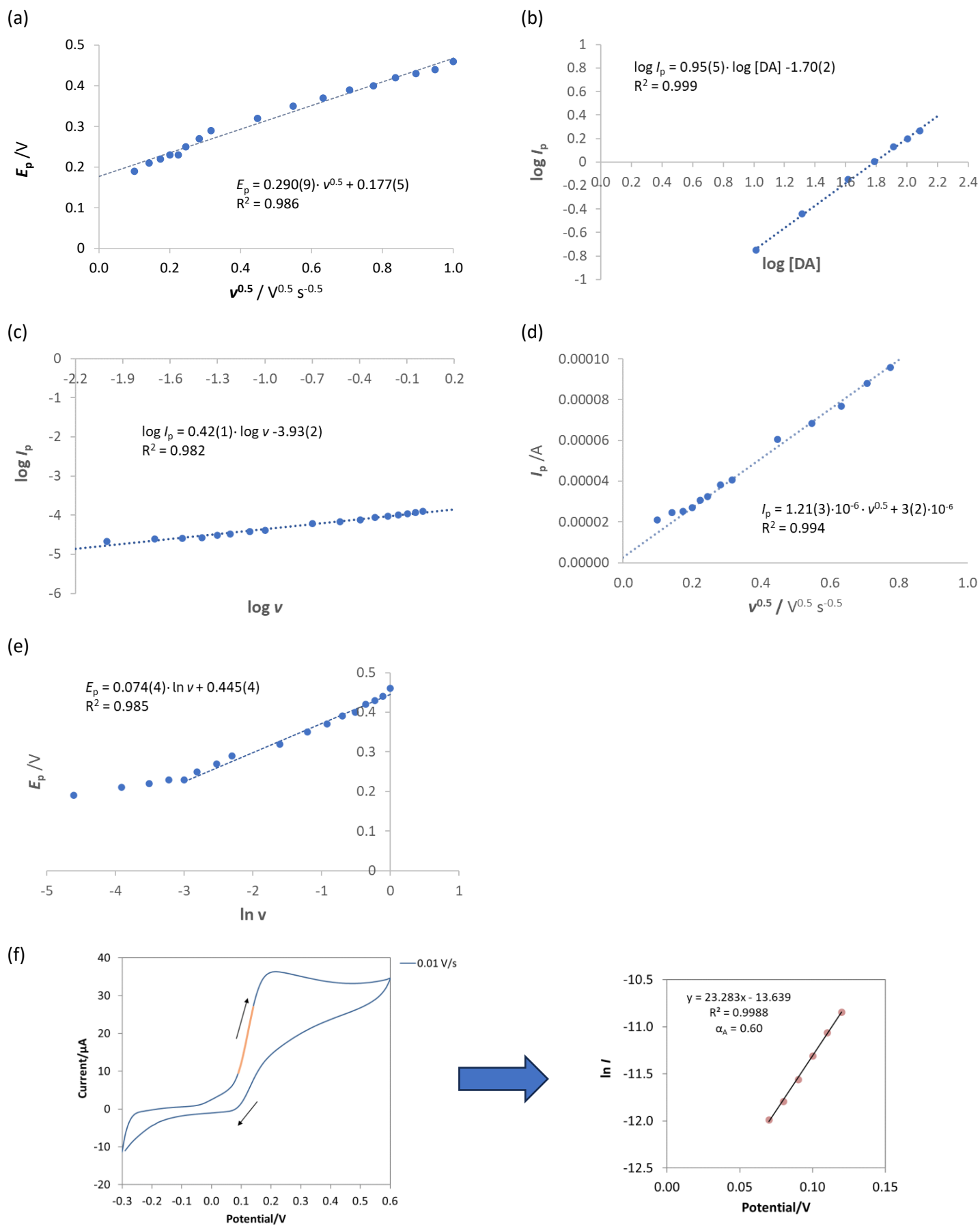


Figure S4. Electrochemical behavior of DA at the bare electrode

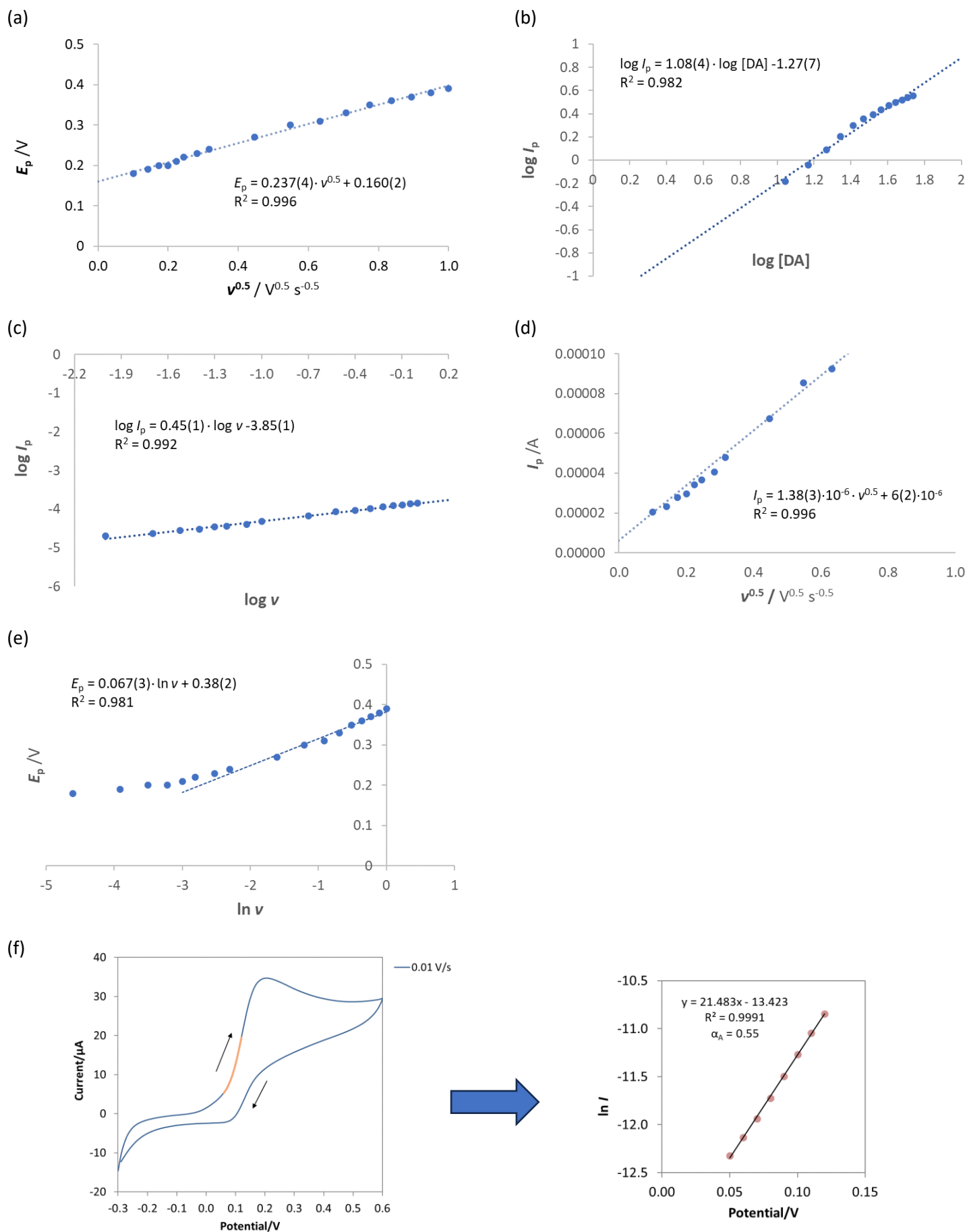


Figure S5. Electrochemical behavior of DA at the e-MIP-modified electrode

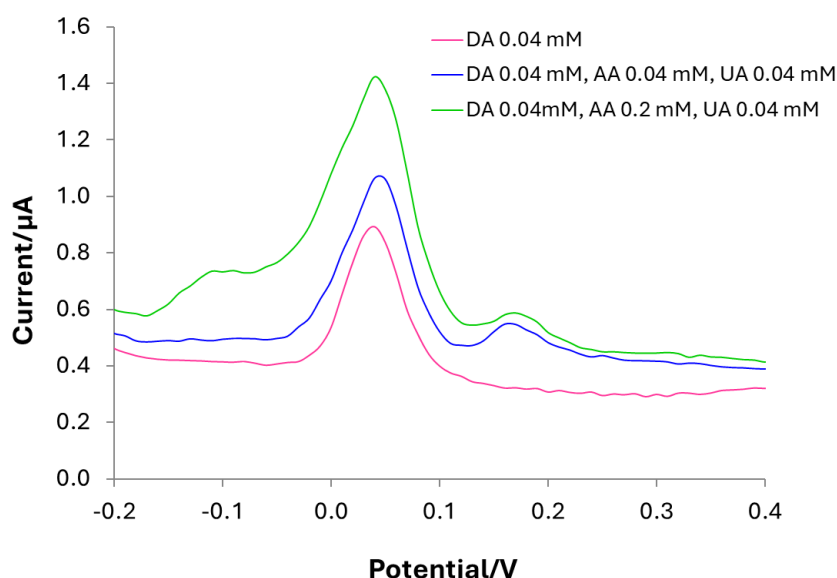


Figure S6. DPV voltammogram in PBS 0.1 M at pH 7 containing 40 μM DA (pink line), 40 μM DA, 40 μM AA and 40 μM UA (blue line), 40 μM DA, 200 μM AA and 40 μM UA (green line).

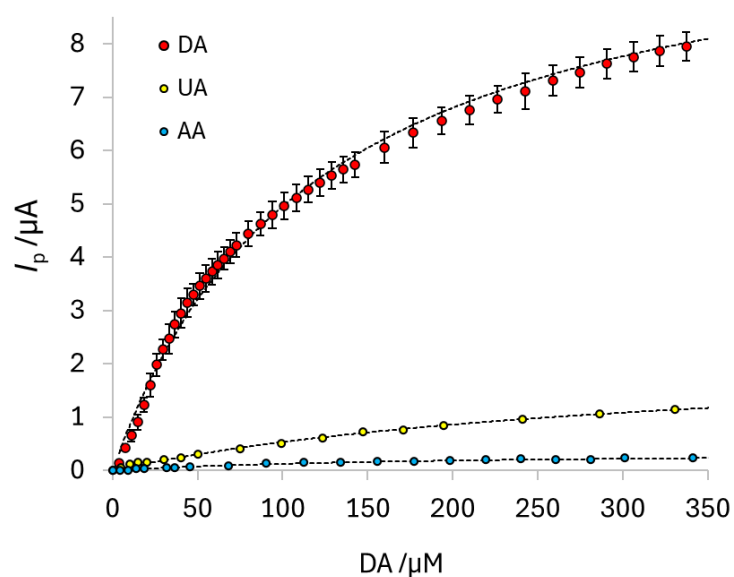


Figure S7. Langmuir fitting for the calibration curves of DA (red points), UA (yellow points) and AA (light blue points) with the e-MIP-modified electrode. The fitting parameters are reported in Table S4.

Table S4. Fitting parameters obtained by applying the Langmuir equation to the calibration curves reported in Figure S7.

analyte	$I_{p,\max} / \mu\text{A}$	$K_{\text{aff}} / \text{M}^{-1}$	R^2
DA	10.8(1)	$8.4(2) \times 10^3$	0.994
UA	2.3(1)	$3.1(3) \times 10^3$	0.992
AA	0.36(2)	$5.6(6) \times 10^3$	0.982