Electronic Supplementary Information

An electrochemical MIP sensors for selective detection of salbutamol based on a graphene/PEDOT:PSS modified screen-printed carbon electrode

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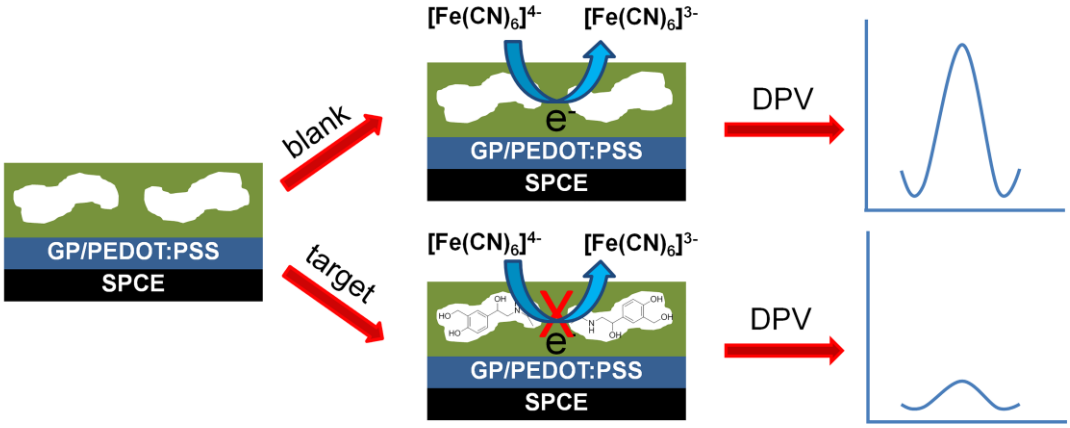
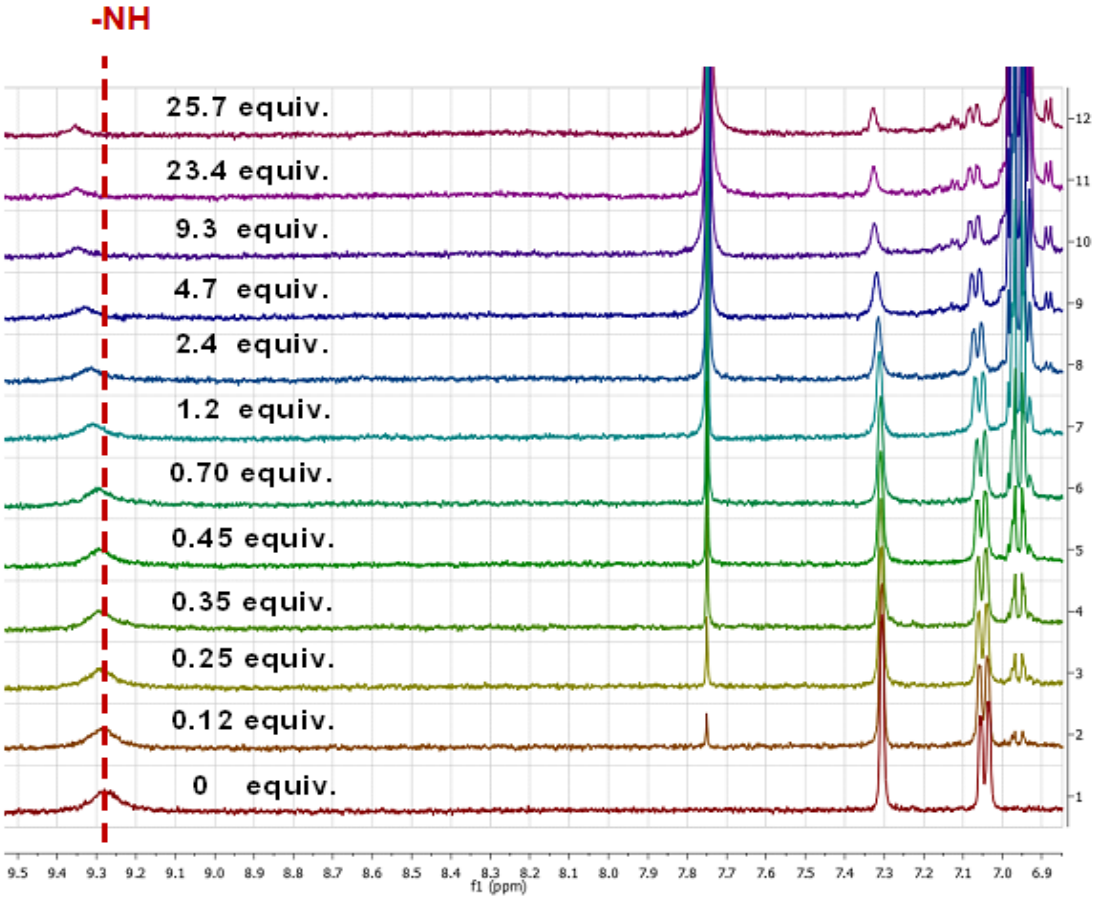


Scheme S1 Schematic illustration for electrochemical determination of salbutamol using an electrochemical MIP sensor.

(A)



(B)

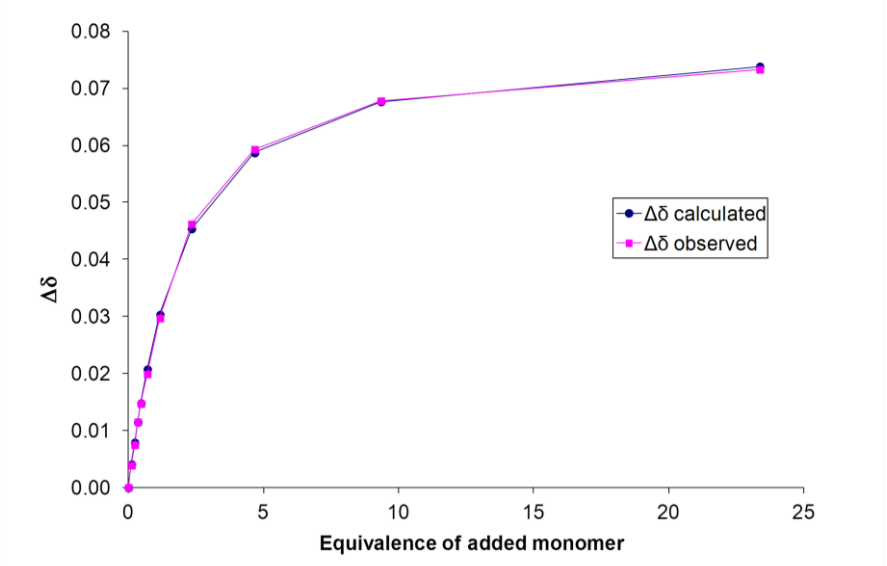


Fig.S1 (A) Partial ^{1}H-NMR spectra (500 MHz, DMSO-d_6) from the titration of salbutamol with 3-aminophenylboronic acid. (B) Observed (magenta square) and calculated (blue circle) values for the ^{1}H-NMR binding study of salbutamol and 3-aminophenylboronic acid.

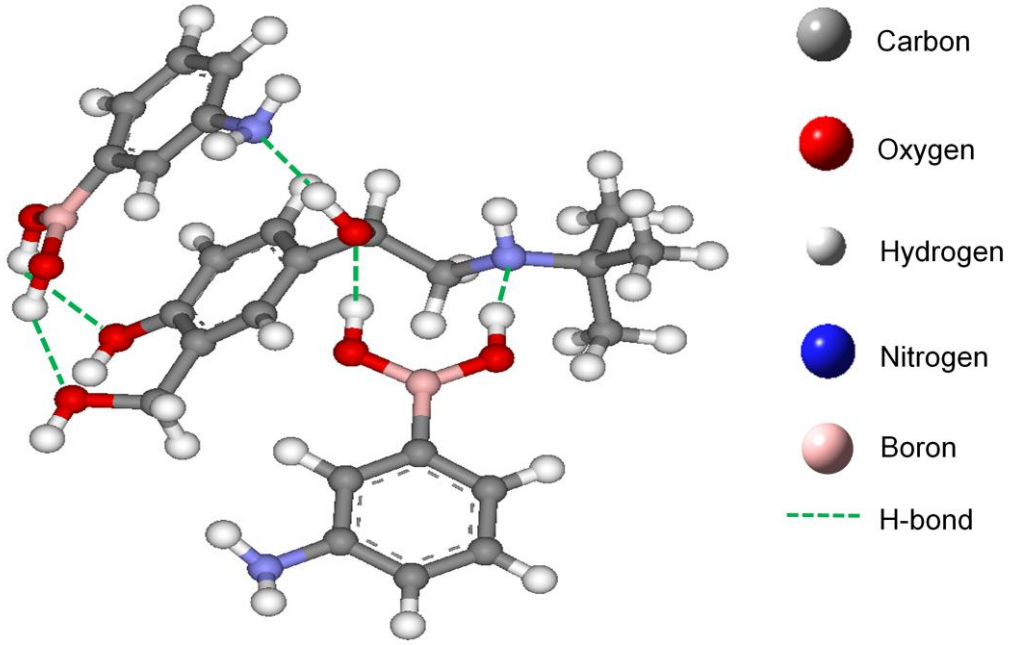


Fig.S2 The optimized geometry of the possible salbutamol/aminophenylboronic acid complex and its interaction energy obtained by a computational simulation.

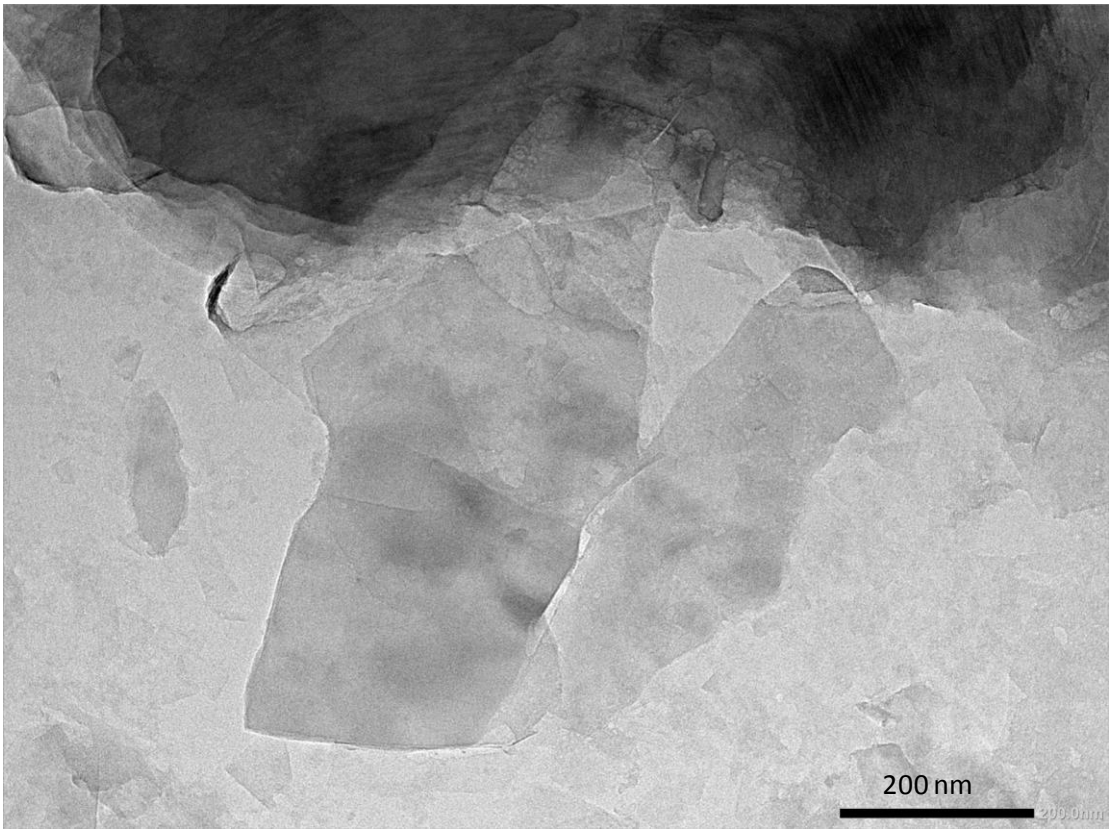


Fig.S3 TEM image of graphene/PEDOT:PSS nanocomposite.

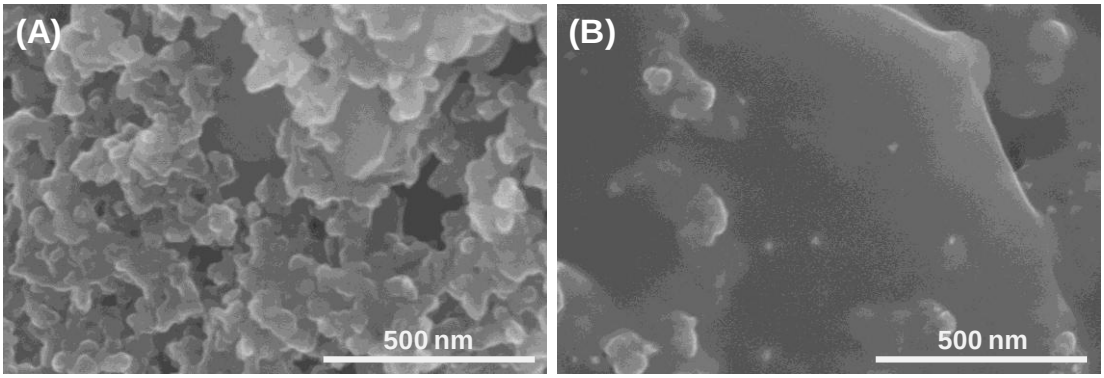


Fig.S4 SEM images of (A) bare SPCE and (B) graphene/PEDOT:PSS modified SPCE.

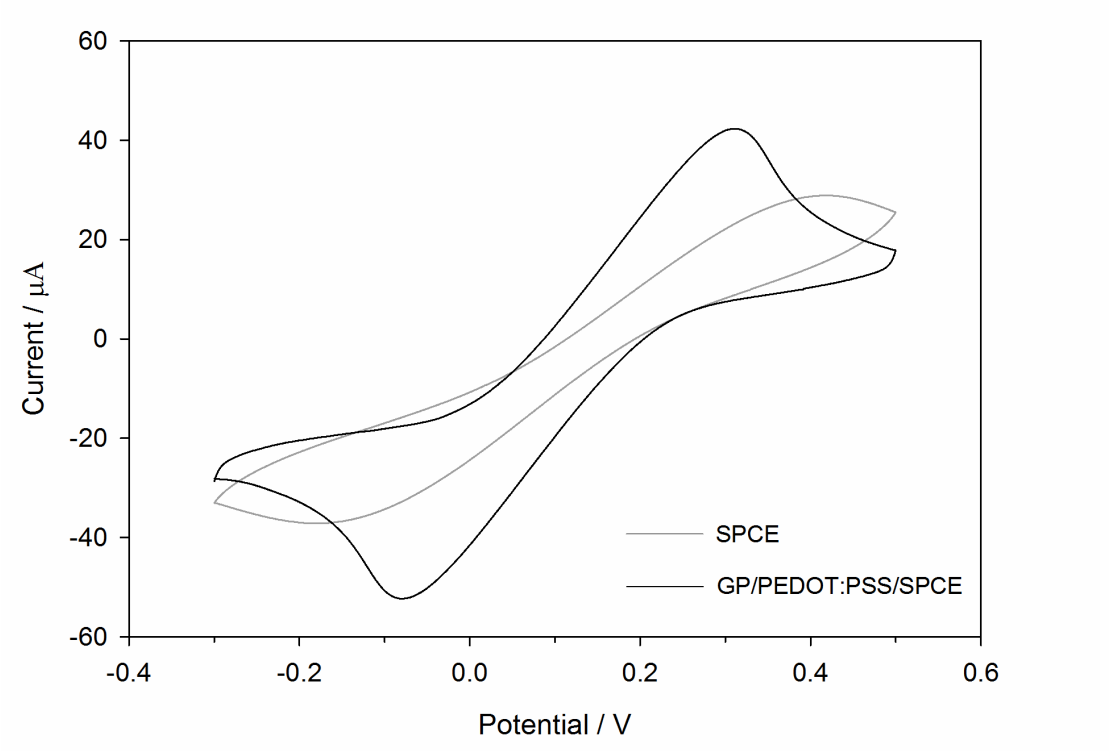


Fig.S5 Cyclic voltammograms of 5 mM $K_3[Fe(CN)_6]$/ $K_4[Fe(CN)_6]$ in 100 mM KCl at bare SPCE and graphene/PEDOT:PSS modified SPCE.

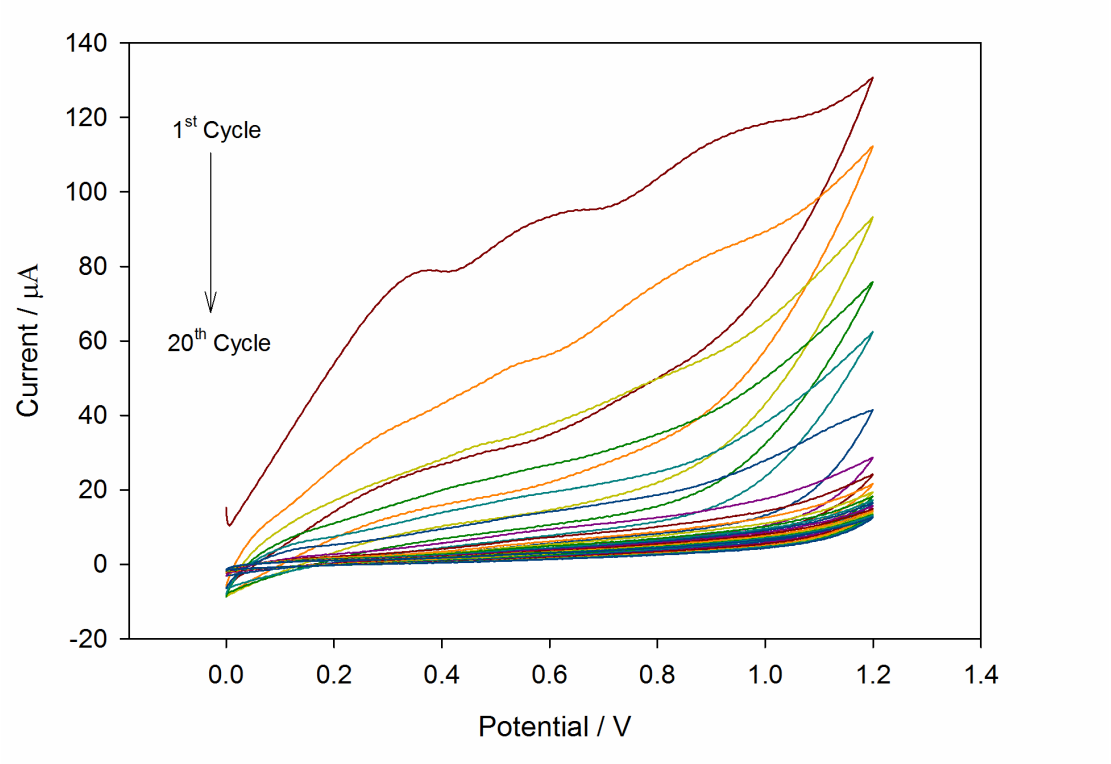


Fig.S6 Cyclic voltammograms for electrochemical polymerization of the imprinted film on graphene/PEDOT:PSS modified SPCE**.**

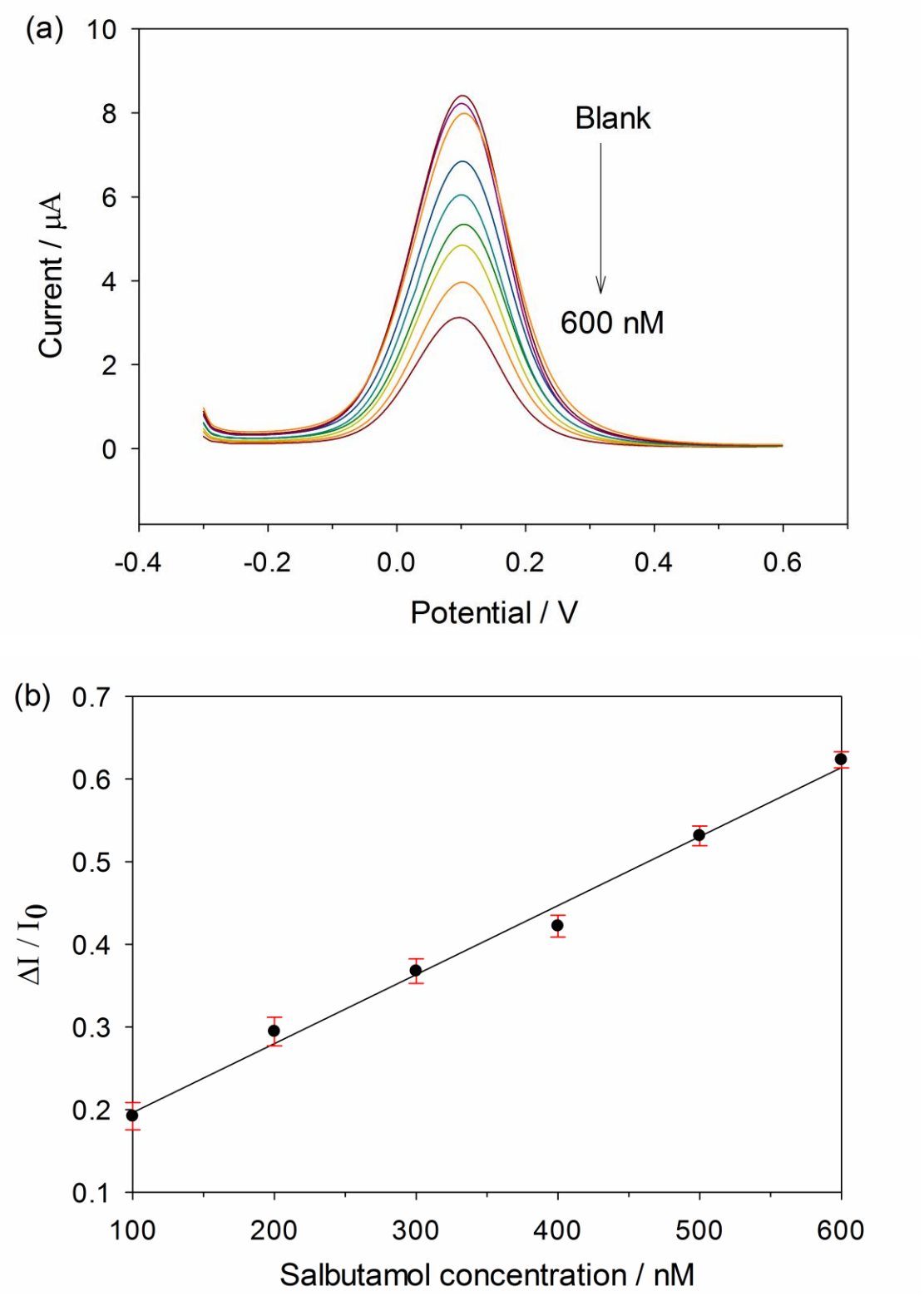


Fig.S7 (a) Differential pulse voltammograms of MIP/SPCE recorded in 5 mM $K_3[Fe(CN)_6]/K_4[Fe(CN)_6]$ after incubation in different concentrations of salbutamol, (b) Calibration curve of the MIP/SPCE. The error bars represent the standard deviation obtained from 6 independent measurements.

Table S1 Association constants of the template molecule with monomers

Template/Monomer	**K_a (M^{-1})**
Salbutamol/3-Aminophenylboronic acid	291 ± 4%
Salbutamol/Scopoletin	30 ± 2%
Salbutamol/Resorcinol	16 ± 3%
Salbutamol/o-Phenylenediamine	- *

* very small

Table S2 Comparison of reported electrochemical sensors for the determination of salbutamol

Electrode material	Detection method	LOD	Linear range	Reference
GP-PEDOT:PSS/SCPE	CV	1.25 μM	5 μM – 550 μM	[1]
NG/ITO	SWV	260 nM	0.17 μM – 6.9 μM	[2]
MnO_2/RGO@NF	DPV	23 nM	42 nM – 1.46 μM	[3]
ZrO_2-polytaurine/GCE	LSV	20 nM	5 μM – 220 μM	[4]
AuNP/GCE	DPSV	20 nM	17 nM – 520 nM	[5]
Poly-ACBK/GO-nafion/GCE	LSV	4.8 nM	7 nM – 125 nM	[6]
Fe_2TiO_5 - CPE	DPAdSV	90 pM	0.2 nM – 25 nM	[7]
Ab-AgPdNPs/Ab-rGO	LSV	4.8 pM	35 pM – 350 nM	[8]
Aptamer/Au	DPA	1.7 pM	0.35 pM – 35 pM	[9]
MIP membrane/SPE	Conductometry	13.5 nM	50 nM – 280 nM	[10]
MIP/Ag-N-RGO/GCE	DPV	7 nM	30 nM – 20 μM	[11]
MIP/SWNTs/GCE	DPV	3 nM	10 nM – 830 nM	[12]
MIPNP-CPE	DPV	0.6 nM	1 nM – 55 nM	[13]
MIP/GP-PEDOT:PSS/SPCE	DPV	0.1 nM	1 nM – 1.2 μM	This work

Ab: antibody, AgPdNPs: silver-palladium alloy nanoparticle, CS: chitosan, GCE: glassy carbon electrode, CPE: carbon paste electrode, DPAdSV: differential pulse adsorptive stripping voltammetry, DPSV: differential pulse stripping voltammetry, GP: graphene, LSV: linear sweep voltammetry, MIPNP: imprinted nanoparticle, MWNTs: multi-walled carbon nanotubes, NF: nickel foam, NG: nano gold, N-RGO: nitrogen doped reduced graphene oxide, Poly-ACBK: poly(acid chrome blue K), SPE: screen printed electrode, SPCE: screen printed carbon electrode, SWNTs: single walled carbon nanotubes, SWV: square wave voltammetry

Table S3 Comparison for determination of salbutamol in real samples using HPLC and the established sensor.

Method	Feed sample			Swine meat		
	Spiked (nM)	Found (nM)	Recovery (%)	Spiked (nM)	Found (nM)	Recovery (%)
This work	1,000	990	99.0	1,000	1,027	102.7
HPLC	1,000	1,011	101.1	1,000	1,034	103.4

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