Supplementary Material

A Portable Nanoporous Gold Modified Screen-Printed Sensor for Reliable and Simultaneous Multi-Vitamins Analysis

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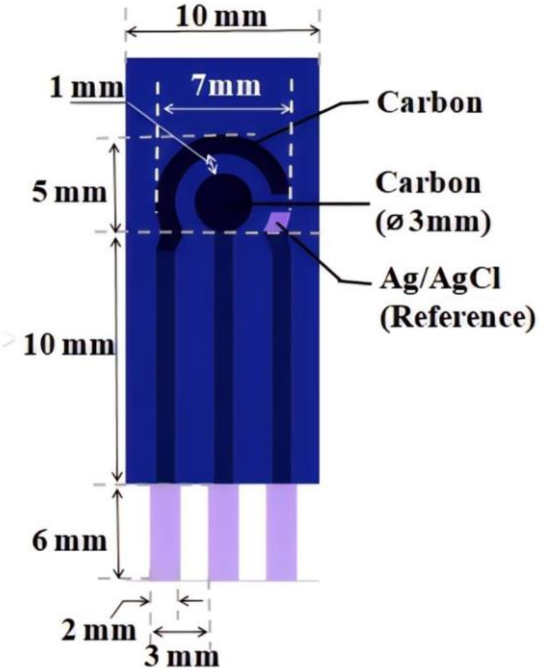

Figure S1. The dimensions and electrode materials of the SPE used in this study.

Table S1. Performance comparison of electrochemical sensors for VB2 detection.

Electrode	Technique	Linear dynamic range (μM)	Sensitivity	LOD (μM)	Refs.
Fe_3O_4 NPs-ePAD (SPE)	SWV	2–20	4.87 μA/μM	0.25	[1]
Bi_2O_3@MWCNT@g-C_3N_4/GCE	LSV	0.02–70	-	1.032	[2]
ZnO-MnO/GCE	DPV	0.05–1102	0.3746 μA/μM	0.013	[3]
AZA/NiHCF/GCE	CV	4.37–1230	0.1352 μA/μM	1.40	[4]
α-Fe_2O_3/GCE	SWV	1.3–100	0.27 μA/μM	8.4	[5]
NPAu/SPE	DPV	5–250	114.90 μA/μM	0.26	This work

GCE, glass carbon electrode; SPE, screen-printed electrode; NPAu, nanoporous gold; AZA, azure A.

Table S2. Performance comparison of electrochemical sensors for VC detection.

Electrode	Technique	Linear Dynamic Range (μM)	Sensitivity	LOD (μM)	Refs.
Au-Pd/MXene/LSG/SPE	DPV	10–1600	-	3.0	[6]
S/NP-Au wire electrode	I-T	0.3–923.3	39–64 μA/μM	0.026	[7]
$Ce_2(SO_4)_3$/rGO/SPCE	DPV	10–1000	0.2973 μA/μM cm^2	900	[8]
CFYM/OCPE	DPV	9.9–280.5	2.1969 μA/μM cm^3	5.95	[9]
PMR/Zn-Al LDH/GCE	DPV	0.10–53.17	-	1.26	[10]
NPAu/SPE	DPV	5–3000	15.00 μA/μM	2.03	This work

NPAu, nanoporous gold; SPE, screen-printed electrode; LSG, laser-scribed graphene; SPCE, screen-printed carbon electrode; CFYM, chicken feet yellow membrane; OCPE, over-oxidized carbon paste electrode; PMR, polymer film of methyl red; Zn-Al LDH, Zn-Al layered double hydroxide.

Table S3. Performance comparison of electrochemical sensors for VB6 detection.

Electrode	Technique	Linear Dynamic Range (μM)	Sensitivity	LOD (μM)	Refs.
$ZnFe_2O_4$/SPGE	DPV	0.8–585	0.0501 μA/μM	0.17	[11]
Pencil graphite electrode	SWV	25–2500	0.13 μA/μM cm^2	11.0	[12]
Fe_3O_4NPs-ePAD/SPE	SWV	200–2000	0.0214 μA/μM	29.5	[1]
TiO_2/SnO_2/GCE	DPV	0.1–31.4	0.759 μA/μM cm^2	0.035	[13]
CuO-PLL/GrE	DPV	3–2076	0.230 μA/μM cm^2	2.3	[14]
NPAu/SPE	DPV	5–3000	20.32 μA/μM	1.50	This work

SPGE, screen-printed graphite electrode; SPE, screen-printed electrode; GCE, glass carbon electrode; CuO-PLL, CuO−poly(L-lysine; GrE, graphene electrode; NPAu, nanoporous gold.

Table S4. Performance comparison of electrochemical sensors for the simultaneous detection of multi-vitamins.

Electrode	Vitamin	Method	Linear Dynamic Range（μM）	LOD（μM）	Refs.
Screen-printed carbon electrode (SPCE)	VB2	SWV	1–60	0.37	[15]
	VC		10–400	5.07	
	VB6		10–400	3.32	
Zn-TiO_2/GCE	VB2	DPV	2–74	0.8	[16]
	VC		7–154	2.5	
	VB6		2–74	0.75	
f-MWCNTs-Cu_2O-Ag_2O/GCE	VB2	DPV	0.2–865	0.1	[17]
	VC		0.05–1152	0.075	
	VB6		0.02–1425	0.052	
Ag-PLA/GCE	VB2	LSV	0.1–23	0.08	[18]
	VC		5–4000	3	
	VB6		10–3000	5	
PEDOT/ZrO_2NPs/GCE	VB2	DPV	0.05–300	0.012	[19]
	VC		0.5–1000	0.2	
	VB6		1–1500	0.45	
NPAu/SPE	VB2	DPV	50–250	0.46	This work
	VC		100–1500	6.44	
	VB6		50–1100	1.92	

GCE, glass carbon electrode; MWCNTs, multi-walled carbon nanotubes; Ag-PLA, silver-doped poly(L-arginine); PEDOT, poly(3,4-ethylenedioxythiophene; NPAu, nanoporous gold.

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