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Supporting Information

Cu Nanodendrite Foams on Integrated Band Array Electrodes for the Non-Enzymatic Detection of Glucose

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Table S1. Latest enzymatic sensors and their analytical performances

Electrode	Sensitivity	Linear range	Stability	Ref.
PAA-VS-PANI/GPL-FePc/GO _x -CH	18.11 μA mM ⁻¹ cm ⁻²	1- 20 mM	50 continuous CV scans showed similar pattern	¹
GOx@PAVE-CNTs	High sensitivity, Linear regression equation; I(μA) = 0.0268 + 2.1971 C _{glucose} (mM)	1.0 μM ~ 5 mM	after 35 days, the current response to initial value still retain at 92.4%	²
GOx-SiO ₂ /Lig/CPE	0.78 μA mM ⁻¹	0.5 – 9 mM	The response current was reduced to 82% and 73% of its initial value after two and three weeks, respectively	³
PNE/GOD/AuNPs@PNE/Au)	35.4 μA mM ⁻¹ cm ⁻²	0.003 – 3.43 mM	After a week, the response was approximately 99.1% of the initial value	⁴
Nafion/GOx/ZnO NRs/ITO	48.75 μA/mM	0.05 – 1 mM	The modified electrode retained 90% of its initial response after 7 days, 85% after 14 days and 57% after 35 days.	⁵
stretchable fiber-based glucose sensor	11.7 μA mM ⁻¹ cm ⁻²	0-500 μM	The sensor gave stable chronoamperometric responses in 6 h operation and 8 days of storage	⁶
GCE/MWCNTs-ConA/GOx	(2.22 ± 0.03) μA mM ⁻¹	5 - 1200 μM	a loss of sensitivity of 20% after 44 days and 22% after the 65 th day	⁷

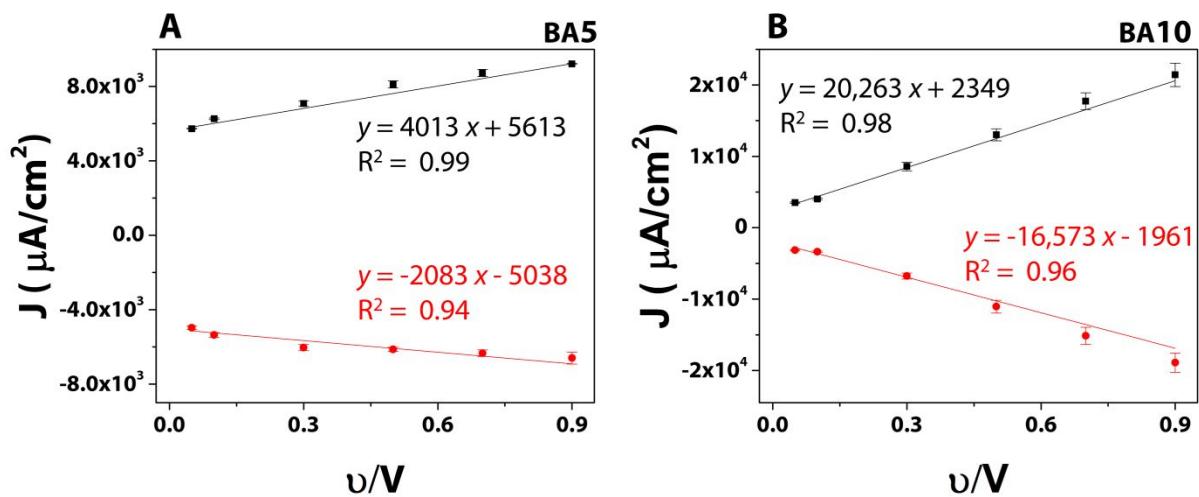


Figure S1. The relationship of anodic and cathodic peak currents versus the scan rate; BA5 (A) and BA10 (B). The scan rate is 0.05, 0.1, 0.3, 0.5, 0.7 and 0.9 V s⁻¹ in a solution of 5 mM Fe(CN)₆^{3-/4-} as a redox probe in 0.01 M PBS (pH 7.4), containing 0.1 M KCl

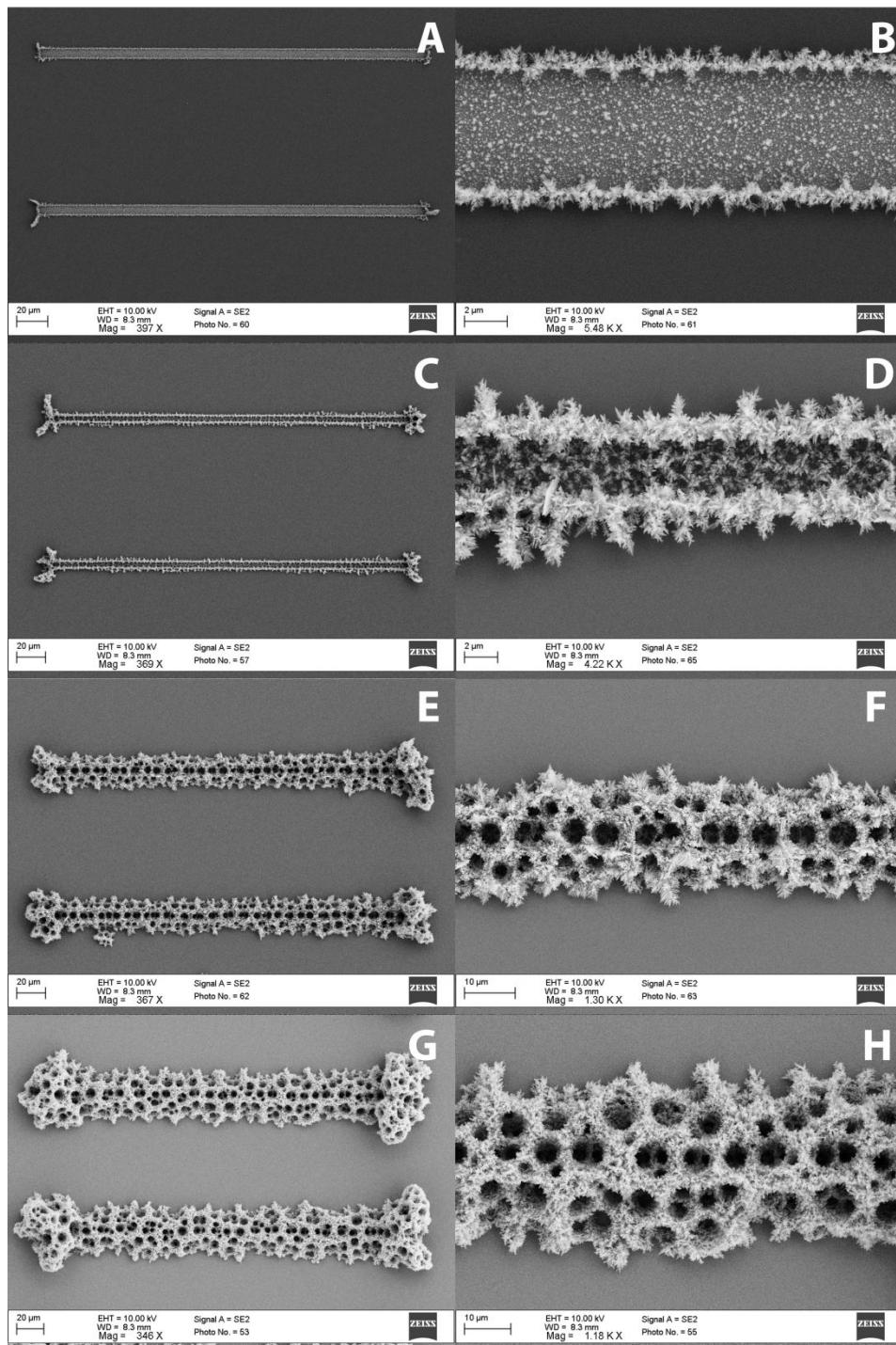


Figure S2. SEM images of BA5-CuFoam electrodes prepared at different Cu²⁺ concentrations; (A,B) 0.05 mg Cu²⁺/2.5 M H₂SO₄, (C,D) 0.20 mg Cu²⁺/2.5 M H₂SO₄, (E,F) 0.50 mg Cu²⁺/2.5 M H₂SO₄ and (G, H) 1.5 mg Cu²⁺/2.5 M H₂SO₄ at a applied voltage of -5 V vs Ag/AgCl, deposition time is 20 seconds.

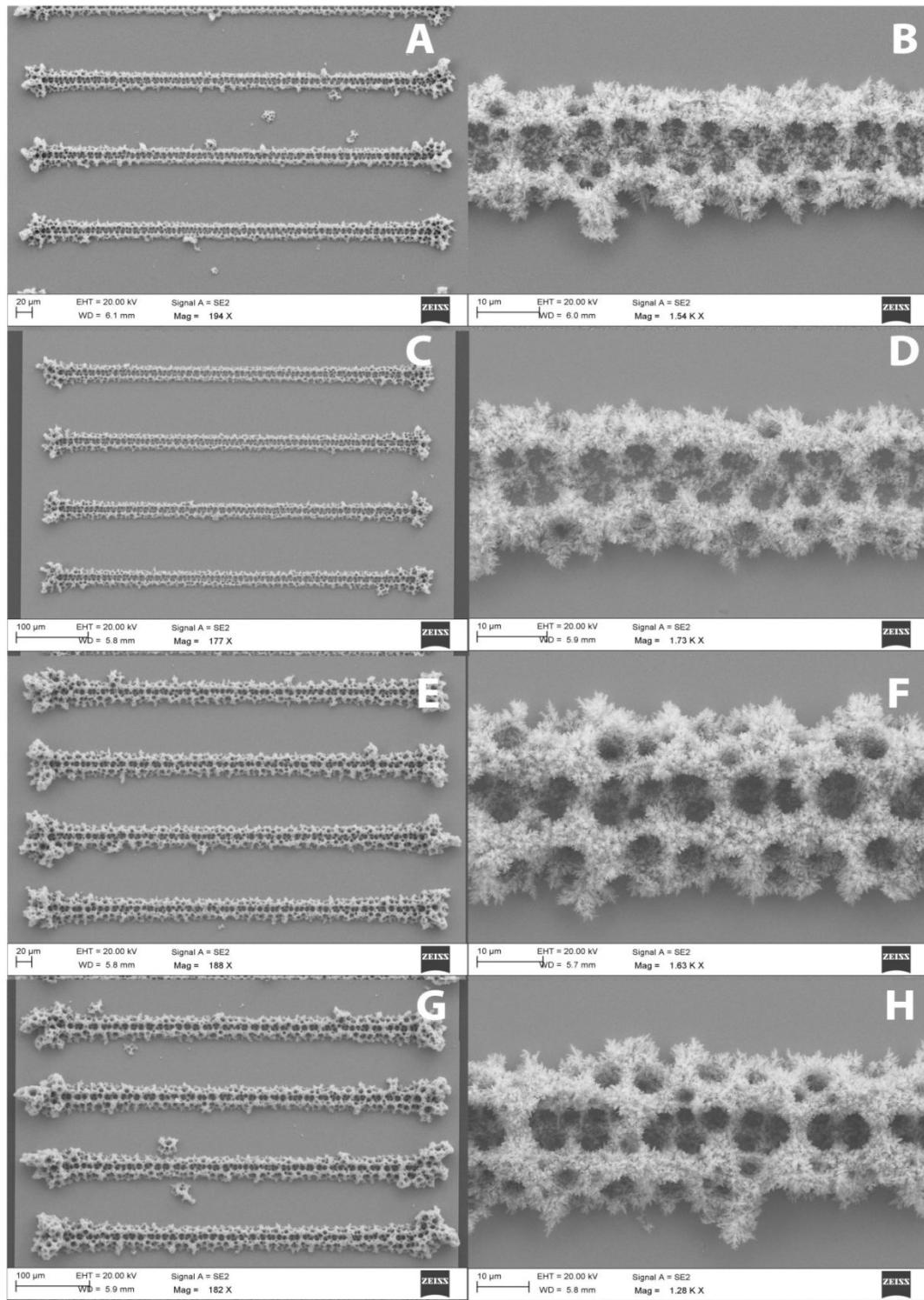


Figure S3. SEM images of BA10-Cu foam electrodes prepared at different deposition times; (A-low magnification, B-high magnification) 15 seconds, (C-low magnification, D-high magnification) 20 seconds, (E-low magnification, F-high magnification) 30 seconds and (G-low magnification, H-high magnification) 35 seconds at a applied voltage of -6 V vs. Ag/AgCl in a solution of 2.5 M H₂SO₄ containing 0.87 mg Cu²⁺

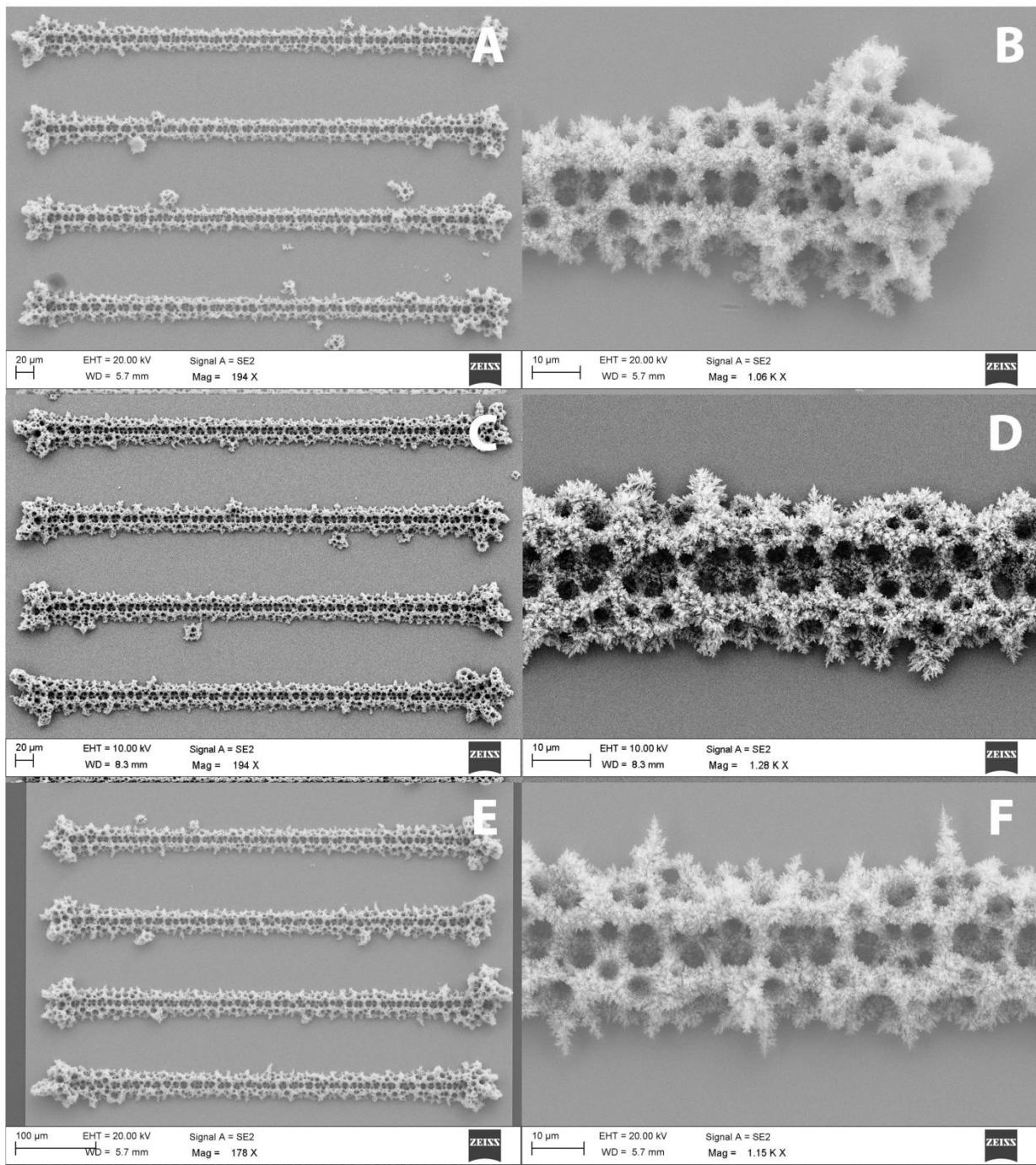


Figure S4. SEM images of BA10-Cu foam electrodes prepared at different applied voltages at -4 V (A-low magnification, B-high magnification), -5 V (C-low magnification, D-high magnification) and -7 V (E-low magnification, F-high magnification) for 30 seconds in a solution of $2.5\text{ M H}_2\text{SO}_4$ containing 0.87 mg Cu^{2+}

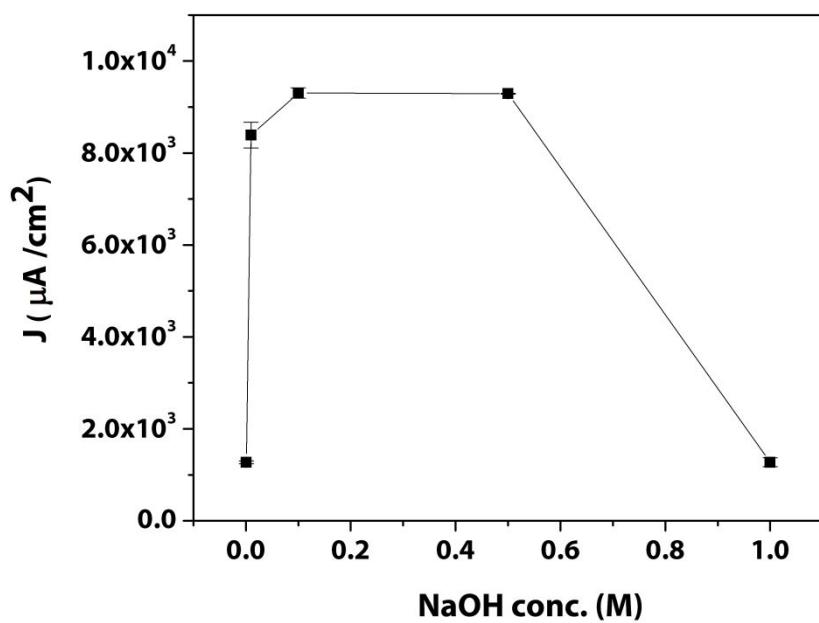


Figure S5. The amperometric response of BA10-CuFoam electrode toward 2 mM glucose in various concentrations of NaOH at a applied potential of 0.45 V; 0.001 M, 0.01 M, 0.1 M, 0.5 M and 1 M NaOH

Table S2. Quantification from survey scan and high resolution spectra of Cu-2p_{3/2} peaks

	Compound	Name	Position	FWHM	R.S.F.	% Conc.
CuFoam surface	survey scan	O 1s	530.6	1.7	2.93	33.9
		C 1s	284.9	1.2	1	26.4
		Cu 2p	932.6	1.0	16.7	39.7
	Cu ₂ O, Cu(OH)2	O 1s_1	530.6	1.0	2.93	18.6
	O from organics	O 1s_2	531.7	1.4	2.93	14.9
	C-C,C=C	C 1s_1	284.8	1.1	1	17.1
	C-O	C 1s_2	286.1	1.5	1	4.0
	O-C=O	C 1s_3	288.2	1.0	1	2.1
	CO ₃	C 1s_4	289.2	1.5	1	3.0
	Cu ₂ O, Cu(0)	Cu 2p_1	932.6	1.0	16.7	31.8
	Cu(OH)2	Cu 2p_2	934.9	1.3	16.7	1.9
		Cu 2p_3	936.3	1.8	16.7	1.1
	satellite	Cu 2p_4	940.7	2.7	16.7	1.4
	satellite	Cu 2p_5	944.1	2.5	16.7	2.8
	satellite	Cu 2p_6	946.8	1.1	16.7	0.8
After glucose electrocatalysis	survey scan	O 1s	530.7	2.8	2.93	40.7
		C 1s	284.9	1.3	1	25.0
		Cu 2p	932.8	1.2	16.7	34.3
	Cu ₂ O	O 1s_1	530.2	1.6	2.93	22.1
	O from organics	O 1s_2	531.7	1.5	2.93	18.6
	C-C,C=C	C 1s_1	284.8	1.2	1	15.7
	C-O	C 1s_2	286.0	1.5	1	4.2
	O-C=O	C 1s_3	288.4	1.4	1	3.5
	CO ₃	C 1s_4	289.5	1.5	1	1.6
	Cu ₂ O, Cu(0)	Cu 2p_1	932.7	1.1	16.7	15.6
	Cu(OH)2	Cu 2p_2	934.6	2.6	16.7	11.0
	satellite	Cu 2p_3	941.6	2.5	16.7	4.2
	satellite	Cu 2p_4	944.1	1.9	16.7	3.5

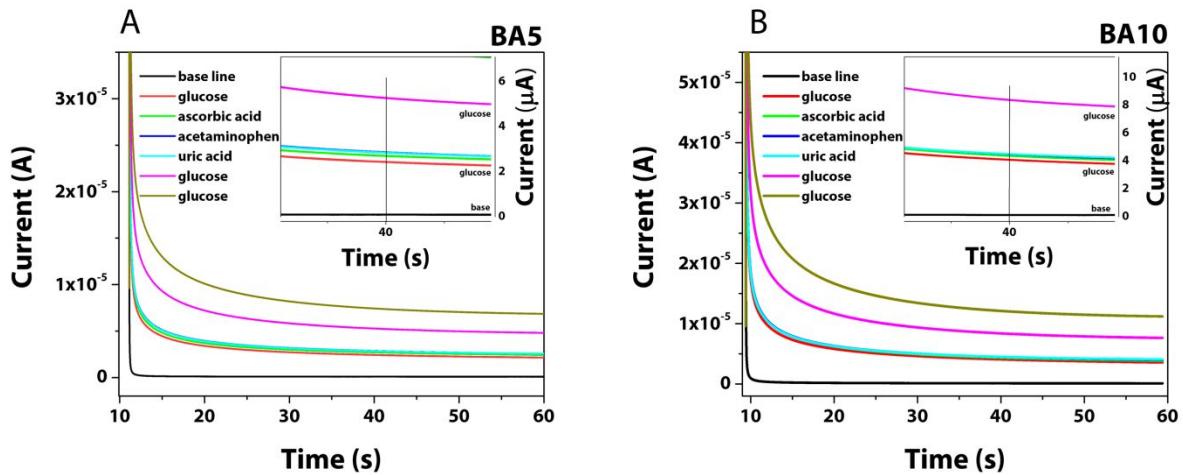


Figure S6. Chronoamperograms of the BA5-Cu foam (A) and BA10-Cufoam (B) sensors obtained in 0.1 M NaOH solution towards 1 mM glucose, 0.1 mM ascorbic acid, 0.1 mM acetaminophen, 0.1 mM uric acid, 1 mM glucose and 1 mM glucose, respectively, at an applied potential of + 0.45 V (inset graphs show the magnified image of the chronoamperograms at 40th second)

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