Supplementary Materials

Electrochemical Characterization of Modified Glassy Carbon Electrodes for Non-Enzymatic Glucose Sensors

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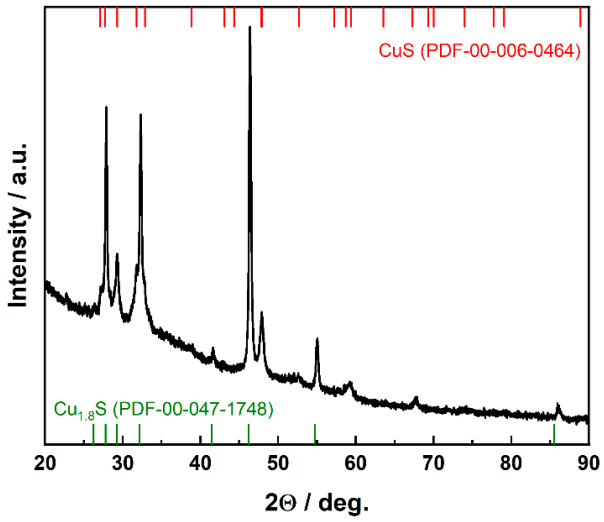


Figure S1. XRD pattern of the obtained copper sulfides.

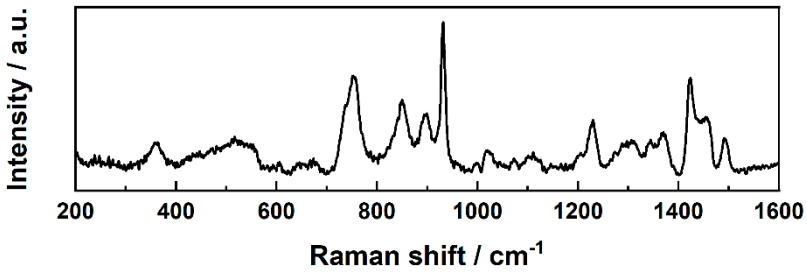


Figure S2. Raman spectra of the PVP powder.

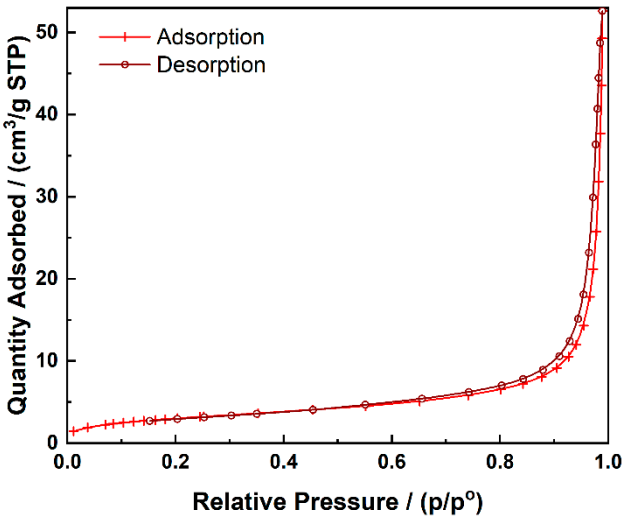


Figure S3. BET analysis: N_2 adsorption-desorption isotherms for copper sulfides.

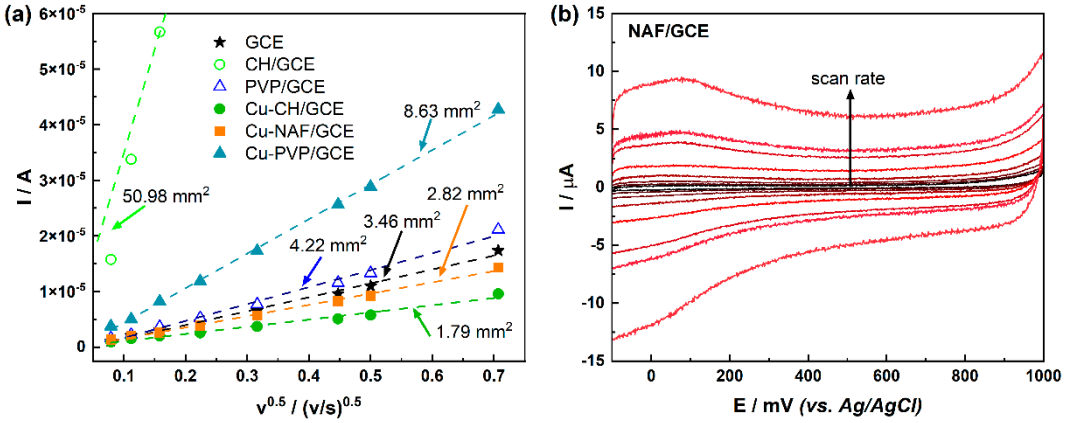


Figure S4. Dependency of the generated peak current on the square root of the scan rate for bare and modified electrodes with fitted regression lines **(a)** and voltammograms recorded with different scan rates (6.25–500 mV) for NAF/GCE **(b)**.

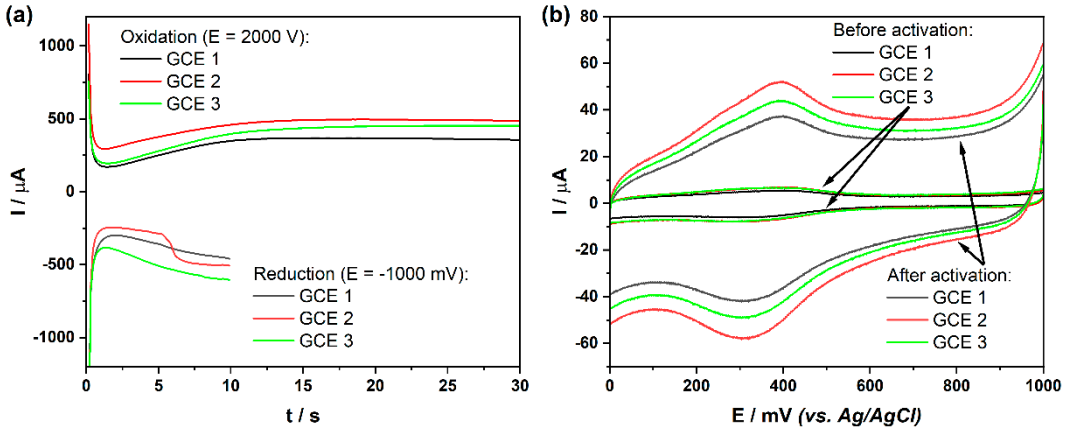


Figure S5. The activation procedure: **(a)** oxidation (30 s) and subsequent reduction (10 s), and **(b)** its influence on the voltammograms.

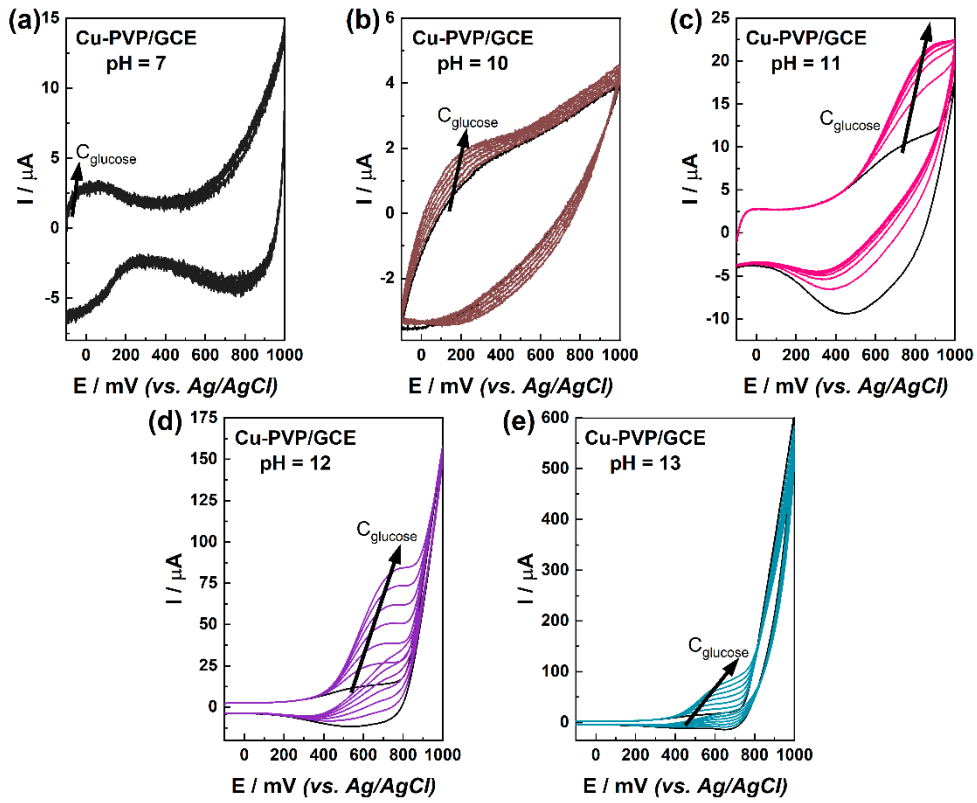


Figure S6. Voltammograms recorded for Cu-PVP/GCE in electrolytes with different pH after a subsequent addition of glucose in the concentration range of 0–1.2 mM (scan speed: 100 mV/s).

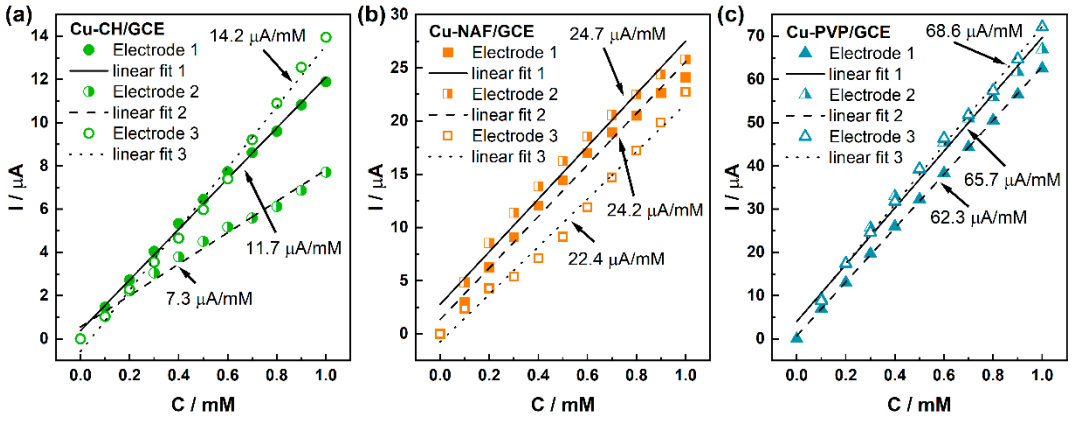


Figure S7. Calibration curves in the glucose concentration range of 0–1 mM for three different electrodes: **(a)** Cu-CH/GCE, **(b)** Cu-NAF/GCE, and **(c)** Cu-PVP/GCE. Values of calibration slopes are given in the graphs.

Table S1. Summary of the reported electrochemical glucose sensors based on copper sulfides with special reference to used electrolyte during the measurements.

Modified Electrode (Binder)	Electrolyte	Applied Potential [mV] / Reference Electrode	Sensitivity [μA/(mM·cm²)]	Reference
CuS/GCE (Nafion)	**PBS (pH = 9.2)**	200 / SCE (saturated)	7842 [μA/mM]	[1]
Cu_2S-DWCNTs/GCE, Cu_2S-MWCNTs/GCE (Nafion)	**10 mM PBS (pH = 7.2)**	500 / Ag/AgCl (3 M KCl)	35, 5.0	[2]
CuS/GCE (Nafion)	**0.1 M Na_2HPO_4**	CV / SCE (saturated)	117.3	[3]
CuS/GCE (chitosan)	**0.1 M PBS (pH = 7.2)**	CV / SCE (saturated)	5.86 [μA/mM]	[4]
CuS/GCE (-)	0.1 M NaOH	700 / SCE (saturated)	64.97	[5]
Cu_2S/Cu foam (-)	0.1 M NaOH	450 / SCE (saturated)	11750.8	[6]
Cu_xO/Cu_2S/GCE (Nafion)	0.01 M NaOH	450 / SCE (saturated	2688	[7]
CuS/GCE (Nafion)	0.1 M NaOH	500 / Ag/AgCl (3M KCl)	1007	[8]
CuS/GCE (PVB)	**0.1 M PBS (pH = 5.5–8.0)**	180 / Ag/AgCl (3.5 M KCl)	-	[9]
CuS/Ni foam (-)	0.5 M NaOH	550 / Ag/AgCl (saturated)	8337	[10]
S-rGO/CuS/GCE, S-rGO/CuS/RDE (-)	0.1 M NaOH	480 / Ag/AgCl (saturated)	- 429.4	[11]
rGO/CuS/GCE (-)	0.1 M NaOH	400 / SCE (saturated)	53.5	[12]
$Cu_2O@Cu_{1.8}S$/RDE (Nafion)	0. 1 M NaOH	500 / Ag/AgCl (saturated)	3630	[13]
CuS/XGCNFs/SPE (-)	0.1 M NaOH, **PBS (pH = 7)**	570 / Ag/AgCl (-)	23690, not working	[14]
CuS/Cu_2S-GO-MWCNTs/GCE (Nafion)	0.1 M NaOH (pH = 11.5, 11.9, 12.3, 12.7, 13.0)	600 / Ag/AgCl (-)	1923 (pH = 12.7)	[15]
Cu_2S/GCE, CuS/GCE, Cu_7S_4/GCE (Nafion)	0.1 M NaOH	500 / Ag/AgCl (saturated)	3610.1, 3594.9, 3728.7	[16]
CuS/GCE	0.1 M NaOH	500 / no information	7.18 [μA/mM]	[17]
CuS/Cu_2O/CuO/Cu (-)	0.1 M NaOH	600 / Ag/AgCl (saturated)	4262	[18]
Cu_2S/ABA/GCE (-)	**1 mM PBS (pH = 7.4)**	1000 / SCE (saturated)	38210	[19]
CuS/GCE, CuS/Cu_2S/GCE (-)	0.1 M NaOH	600 / SCE (saturated)	130.2, 321.3	[20]
Cu_2S-Cu_2O/GCE (Nafion)	0. 1 M NaOH	650 / Ag/AgCl (saturated)	1876	[21]

Abbreviations: GCE – glassy carbon electrode, DWCNTs – double-walled carbon nanotubes, MWCNTs – multi-walled carbon nanotubes, CV – cyclic voltammetry glucose detection, PVB – poly(vinyl butyral), RDE – rotating disk electrode, GO – graphene oxide, rGO – reduced graphene oxide, S-rGO – sulfur doped reduced graphene oxide, XGCNFs – xanthan gum carbon nanofibers, SPE – screen printed electrode, ABA – m-aminobenzoic acid.

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