

Supplementary Materials

The Role of Functional Layer Composition of Glucose Test-Strips on Stability of Electrochemical Response

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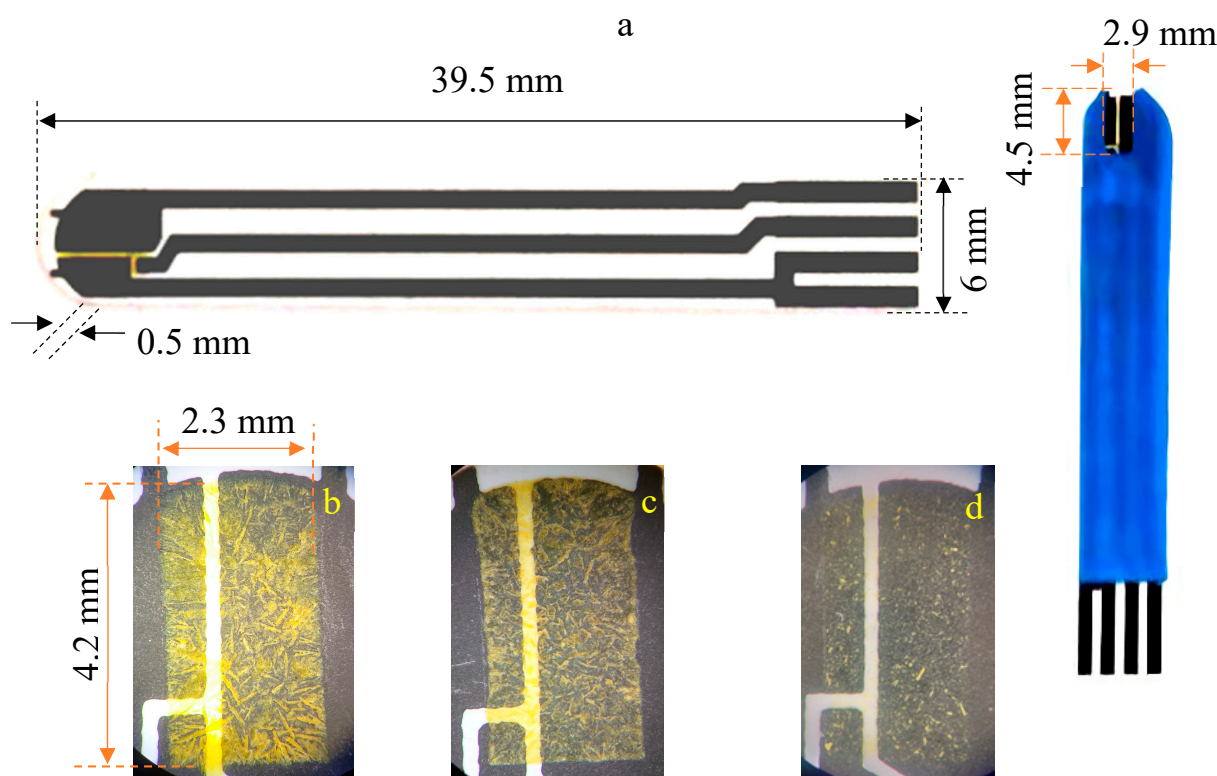
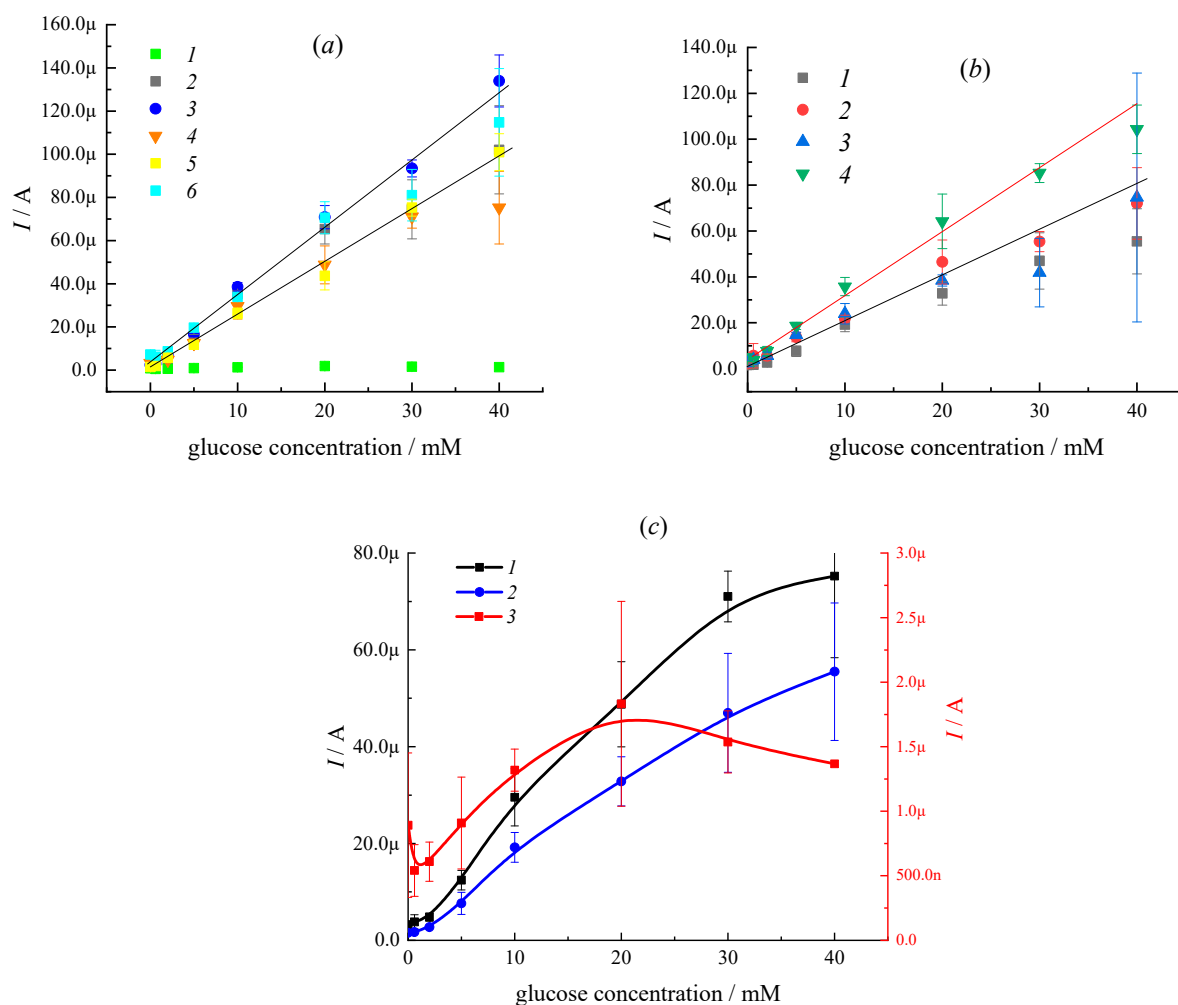


Figure S1 – (a) The typical view and dimensions of SPE test-strips used in this study with and without a capillary gap. (b-d) Optical microscope images obtained from the dried functional layer deposited on the surface of SPE by screen-printing technique utilizing 60 μm foil. The gel composition: (b) 10 mg/mL CMC, 25 mg/mL ALG, 200 mg/mL FC, 12 mg/mL GOx (in CitB, pH 6); (c) 10 mg/mL CMC, 50 mg/mL AS, 200 mg/mL FC, 12 mg/mL GOx (in CitB, pH 6); (d) 10 mg/mL CMC, 25 mg/mL AS, 25 mg/mL 9,10-Phenantroline-5,6-dione, 24 mg/mL GOx (in CitB, pH 6).

Table S1 – Buffer systems abbreviation and composition

Buffer system	Abbreviation	Used components	pH
0.1 M citrate buffer	CitB	citric acid, NaOH	6.0
isotonic (0.15M NaCl) 0.05 M potassium phosphate buffer	PPBI	KH_2PO_4 , NaCl, NaOH	7.4
0.1 M acetate buffer	AcB	acetic acid, NaOH	5.5

**Figure S2** – Selected glucose calibration curves illustrating the influence of the gel content on the shape of the curves (current was recorded at 5 s):

(a) – shown for the gels with and without addition of sodium alginate, (b) – shown for the gels with addition of Aerosil 380; (c) – shown the S-type calibration for low content of FC or GOx

Gel composition in 0.1M citrate buffer, pH 6 was as follows:

(a) 1 – 20CMC/50FC/2GOx, 2 – 20CMC/200FC/12GOx, 3 – 20 CMC/200FC/24GOx,
4 – 10CMC/15ALG/200FC/2GOx, 5 – 10CMC/15ALG/200FC/9GOx,
6 – 10CMC/25ALG/200FC/9GOx.

(b) 1 – 20CMC/75AS/100FC/9GOx, 2 – 20CMC/75AS/150FC/9GOx,
3 – 10CMC/50AS/150FC/9GOx, 4 – 10CMC/50AS/200FC/9GOx.

(c) 1 - 10CMC/15ALG/200FC/2GOx; 2 - 20CMC/75AS/100FC/9GOx; 3 - 20CMC/50FC/2GOx

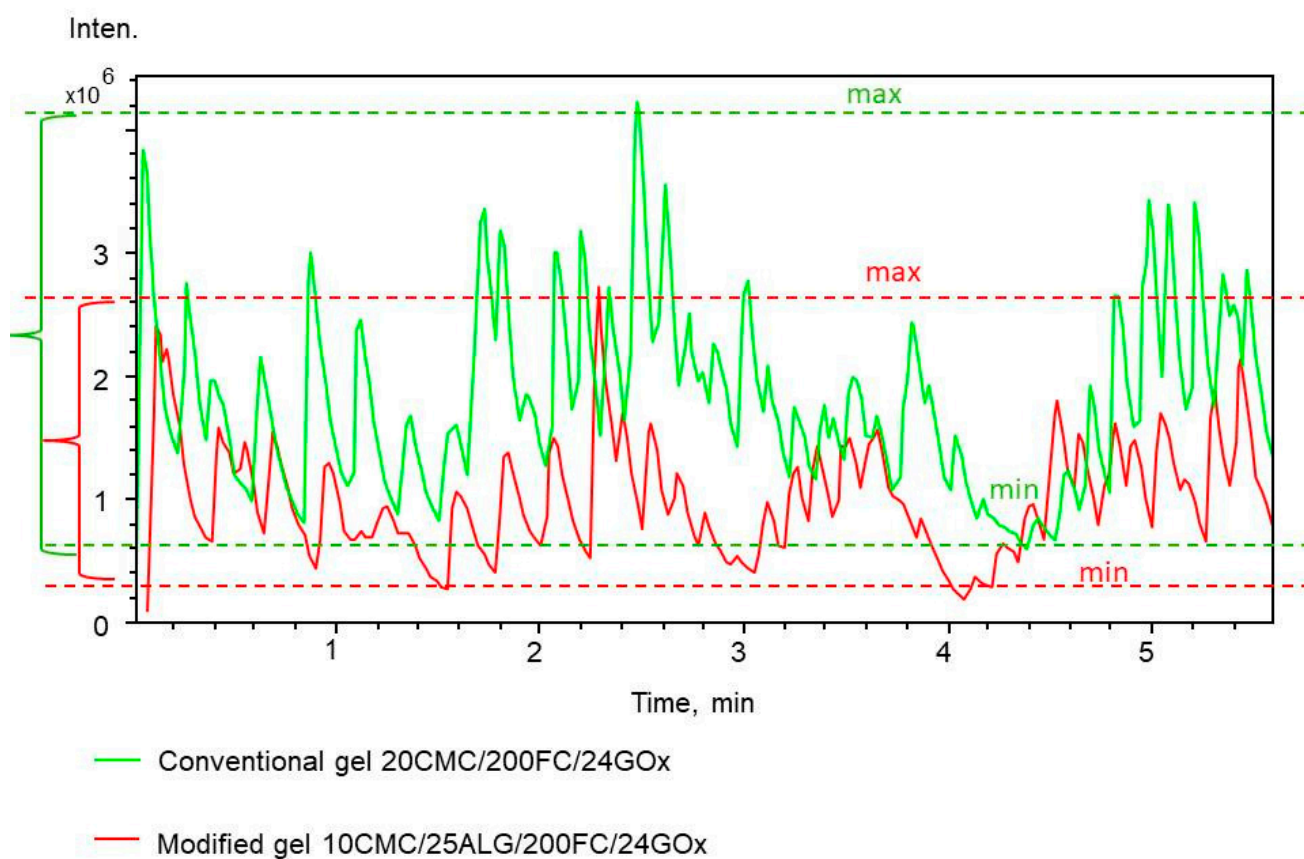


Figure S3 – LDI-MS full scan TIC-chromatograms (all ions) obtained from SPE covered by conventional and modified gels via screen printing approach.

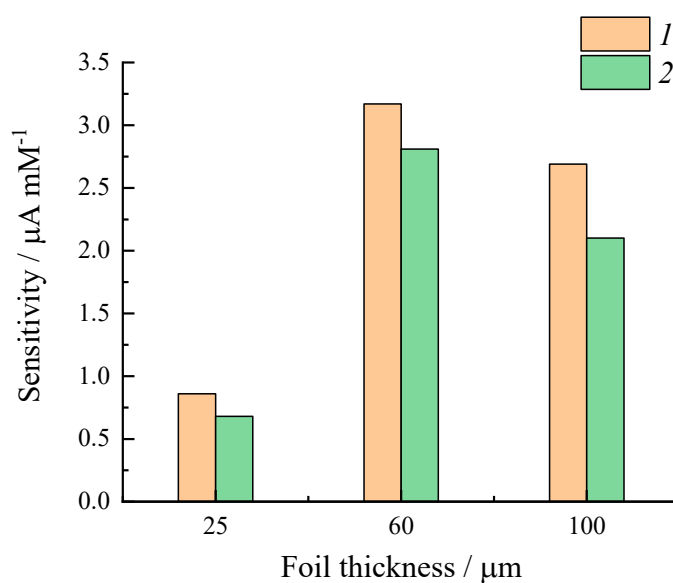


Figure S4 – Impact of the thickness of functional layer on sensitivity of glucose test-strips based on 10CMC/25ALG/200FC/9GOx (1) and 10CMC/50AS/200FC/9GOx (2) gels.

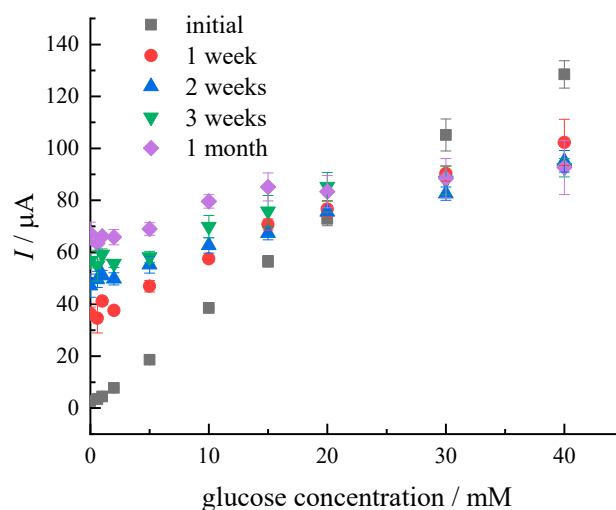


Figure S5 – Current degradation recorded from glucose test-strips with the functional 10CMC/25ALG/200FC/24GOx (CitB, pH 6.0) layer after a short stress-heating test at 120 °C for 30 s (black curve) and consequent storage at 55 °C for 1-4 weeks (other colours).

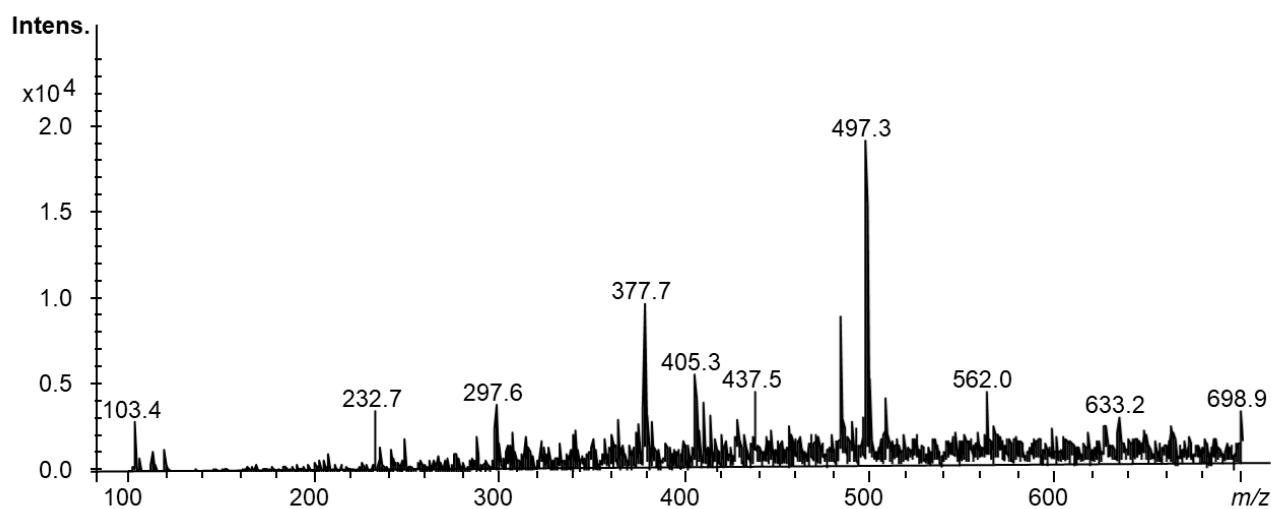


Figure S6 – LDI-MS spectra obtained from SPE modified by FC in PPBI after storage for 3 days in the access of light at 55 °C.