chemosensors

MDPI

Perchlorate Solid-Contact Ion-Selective Electrode Based on Dodecabenzylbambus[6]Uril

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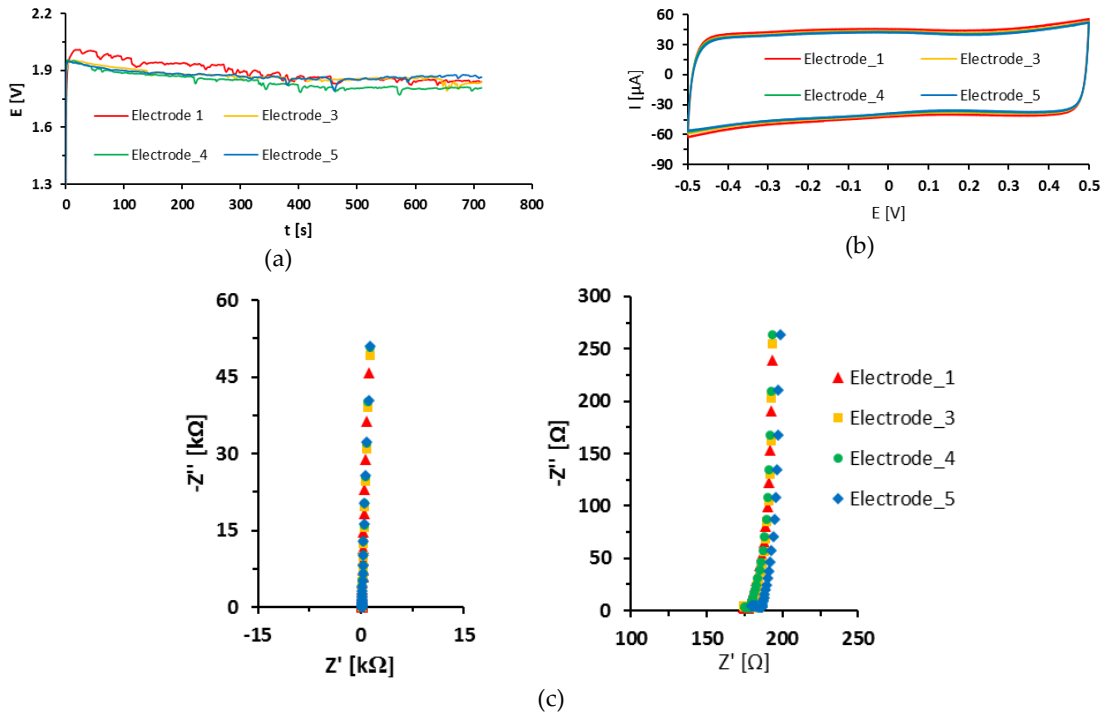
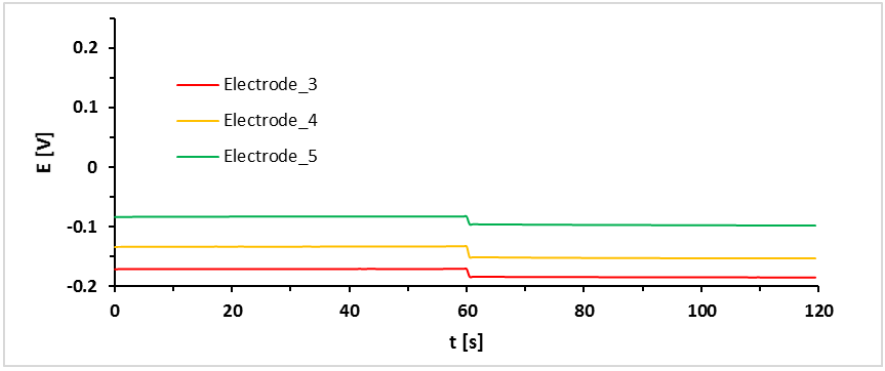
Electronic Supporting Materials:

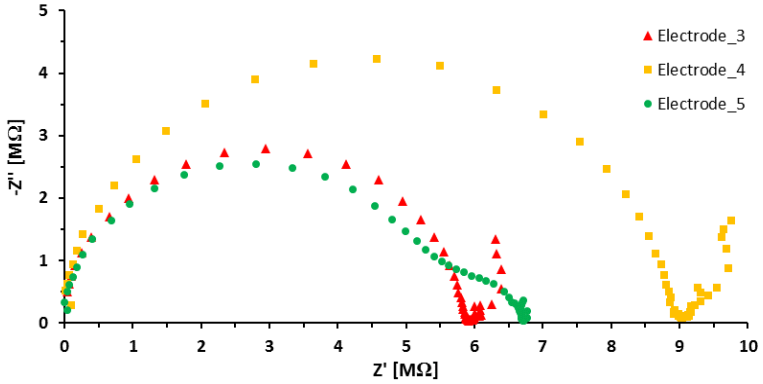


(a) (b) (c)

Figure S1. Characterization of GC/PEDOT electrodes without ISM: chronopotentiometric traces recorded during electrodeposition of PEDOT on GC from 0.01 M-EDOT solution containing 0.1 M KCl (a); CV traces of GC/PEDOT electrodes (5th cycle) recorded in 0.1 M $NaClO_4$ (scan rate 0.1 $V.s^{-1}$) (b); impedance spectra of GC/PEDOT electrodes in 0.1 M $NaClO_4$ measured in the frequency range 10 kHz-10 mHz (left) 10 kHz-2 Hz (right) at E_{dc} = 200 mV and ac amplitude = 10 mV(c).

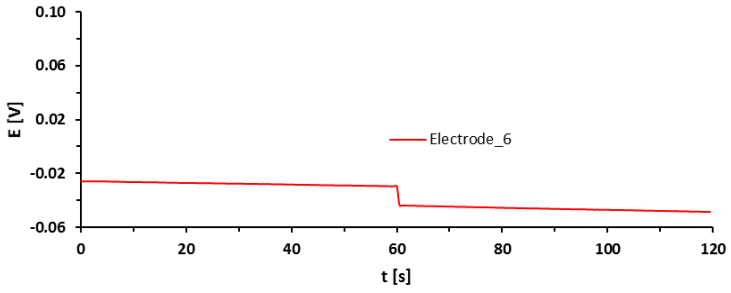


(a)

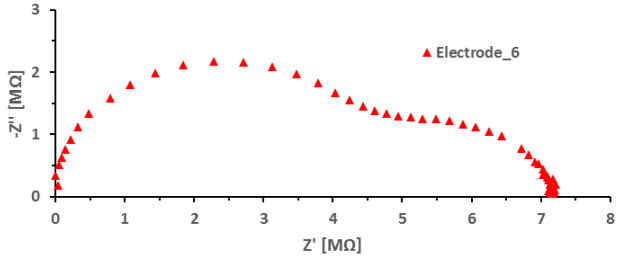


(b)

Figure S2. GC/PEDOT/ISM electrodes with ISM containing BBU (the composition is given in Tables 1 and 2): chronopotentiometric traces recorded in 0.1 M $NaClO_4$ solution at an applied current of +1 nA (0-60 s) and -1 nA (60-120 s) (a); impedance spectra of GC/PEDOT/ISM electrodes in 0.1 M $NaClO_4$ measured in the frequency range 100 kHz-10 mHz at E_{dc} = 200 mV and ac amplitude = 100 mV (b).



(a)



(b)

Figure S3. GC/PEDOT/ISM electrode with ISM containing BBU (the composition is given in Tables 1 and 2) conditioned in 0.1 M $NaClO_4$: chronopotentiometric traces recorded in 0.1 M $NaClO_4$ at an applied current of +1 nA (0-60 s) and -1 nA (60-120 s) (a); impedance spectra of GC/PEDOT/ISM in 0.1 M $NaClO_4$ measured in the frequency range 100 kHz-10 mHz at E_{dc} = 200 mV and ac amplitude = 100 mV (b). .

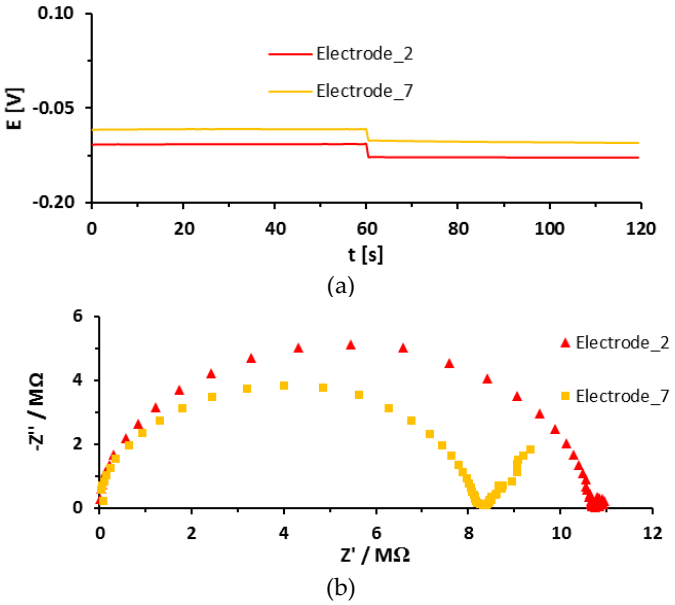
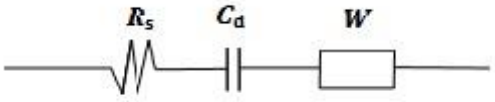
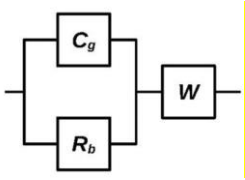


Figure S4. GC/PEDOT/ISM electrodes with ISM in absence and presence of BBU (the composition is given in Tables 1 and 2): chronopotentiometric traces recorded in 0.1 M $NaClO_4$ at an applied current of +1 nA (0-60 s) and -1 nA (60-120 s) (a); impedance spectra of GC/PEDOT/ISM in 0.1 M $NaClO_4$ measured in the frequency range 100 kHz-10 mHz at E_{dc} = 200 mV and ac amplitude = 100 mV (b).



Scheme S1. The equivalent electrical circuit model for the GC/PEDOT(Cl) electrode without ISM, where R_s is solution resistance (+ PEDOT ohmic resistance), C_d bulk (electronic) capacitance and W finite-length Warburg diffusion impedance – see ref. [Bobacka, J.; Lewenstam, A.; Ivaska, A. Electrochemical impedance spectroscopy of oxidized poly(3,4-ethylenedioxythiophene) film electrodes in aqueous solutions. *J. Electroanal. Chem.* **2000**, *489*, 17–27].



Scheme S2. The equivalent circuit model for the GC/PEDOT/ISM electrode, where R_b is the membrane (ISM) bulk resistance, C_g is the membrane (ISM) geometric capacitance, and W is the Warburg diffusion element [Ding R.; Joon, N.K.; Ahamed, A.; Shafaat, A.; Guzinski, M.; Wagner, M.; Ruzgas, T.; Bobacka, J,; Lisak; G. Gold-modified paper as microfluidic substrates with reduced biofouling in potentiometric ion sensing. *Sens. Actuators B. Chem.* **2021**, *344*, 130200.].