

Supplementary information

Conductometric Sensor for Potassium Ion Profiling Using Lipophilic Salt-Incorporated Non-Toxic Ion-Selective Membrane

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Conductivity measurement

The resistance was measured using the Sciospec ISX3v2 Impedance Analyser (Sciospec Scientific Instruments GmbH, Germany). Electrical conductivity (σ) was determined using the relationship $\sigma = L/RA$, where R is the measured resistance, A is the cross-sectional area (obtained via profilometry), and L represents the fixed length of the measured region, which is 5 mm. The conductivity of the Au-IDE was calculated to be 51510 S/m.

Figure S1

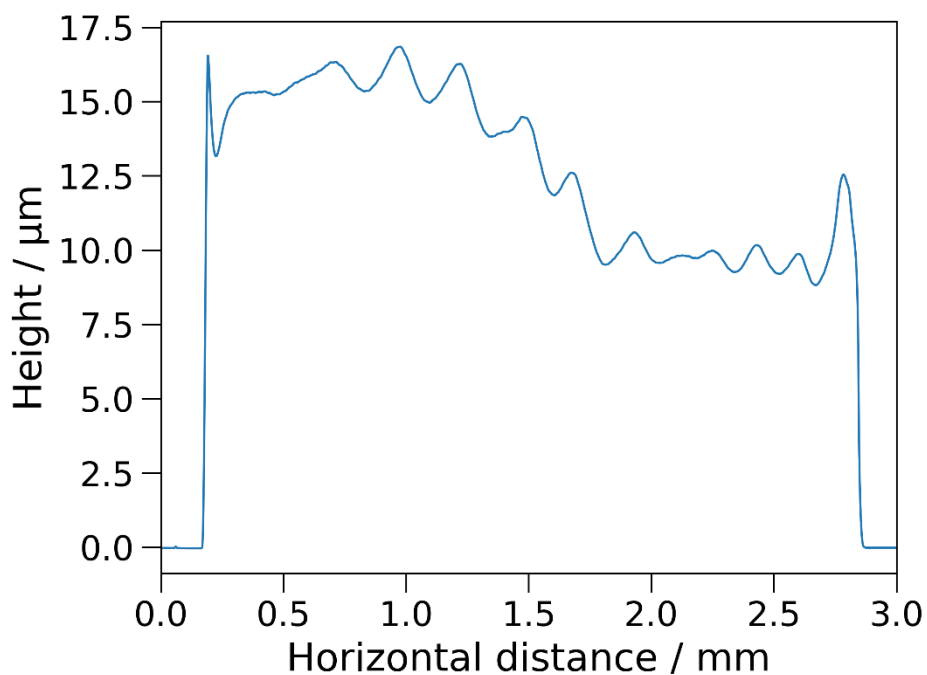


Figure S1 The measurement of the ISM membrane height profile performed with Dektak XT profilometer. The average thickness was found to be $\sim 12 \mu\text{m}$.

Figure S2

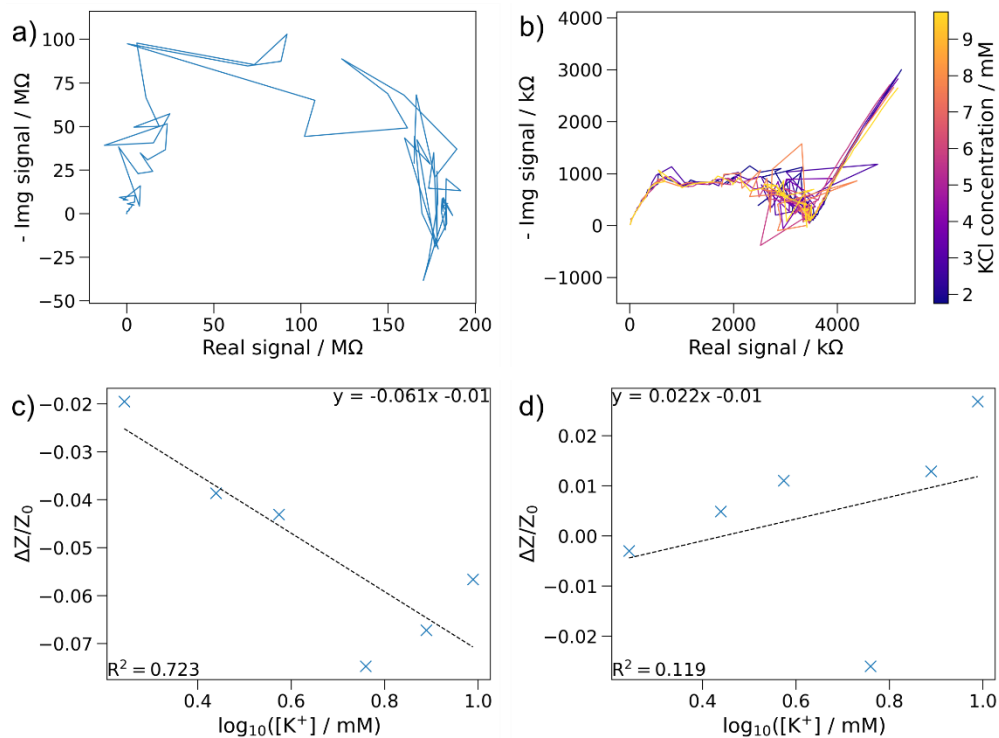


Figure S2 (a) Nyquist plot of the impedance spectra recorded in 0.75 x PBS for the ion-selective electrode (ISE) without lipophilic salt (0 wt% KTpClPB). (b) Nyquist plot for the ISE containing 1.1 wt% KTpClPB under identical conditions, measured across increasing KCl concentrations (1.75–8.75 mM). (c, d) Fractional difference response ($\Delta Z/Z_0$) plotted against the logarithm of potassium ion concentration $[K^+]$ (1.75–8.75 mM), measured at 100 Hz (c) and 0.2 Hz (d), respectively.