

Supporting Information for:
Versatile polymeric membrane ion-selective electrodes based on
cellulose triacetate

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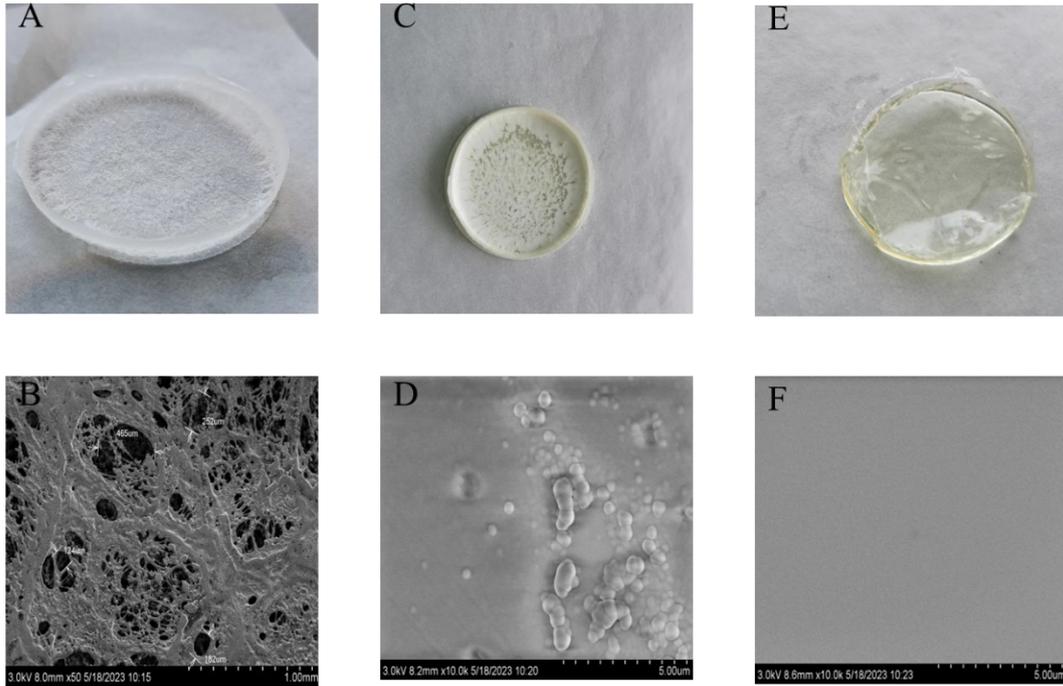


Fig. S1. Macrophotography and SEM images of the (A, B) CA-30000, (C, D) CA-50000 and (E, F) CTA membranes, respectively.

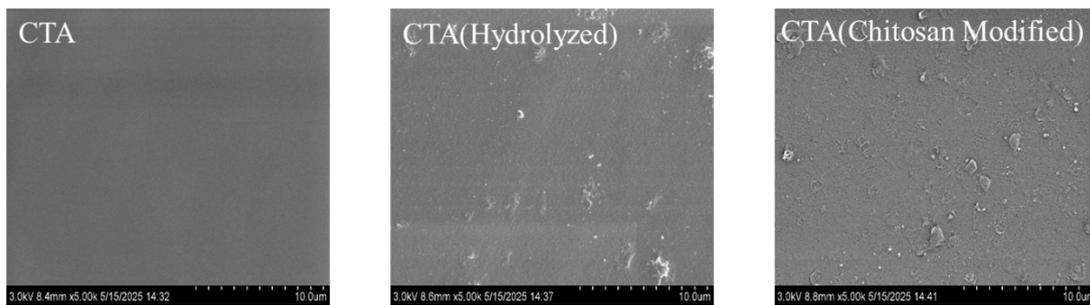


Fig. S2. SEM images of different ion-selective membranes including the CTA membrane, hydroxylated CTA membrane and chitosan-modified CTA membrane.

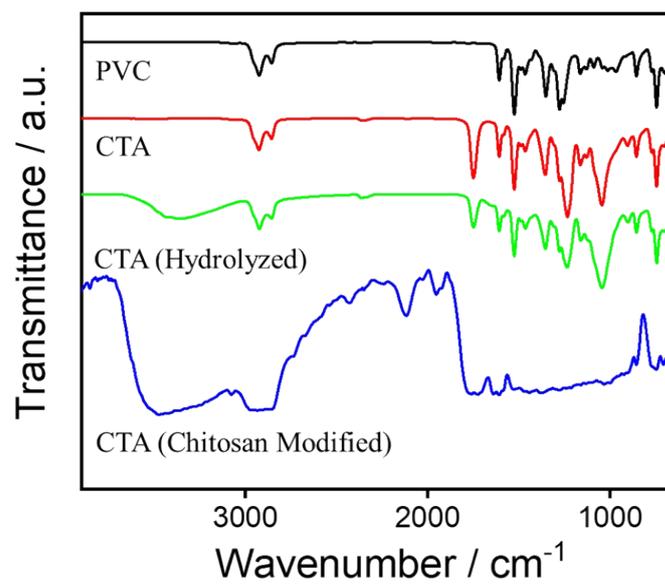


Fig. S3. ATR-FT-IR spectra of different polymeric ion-selective membranes.

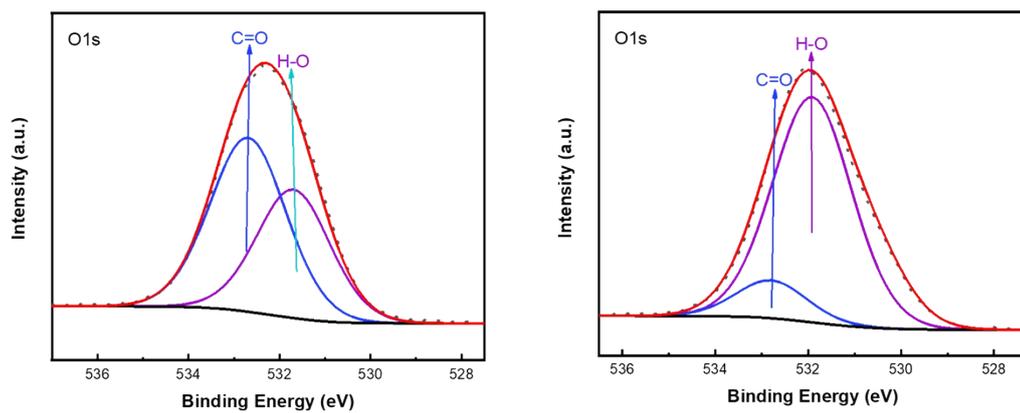


Fig. S4. XPS characterization of the CTA membrane and hydrolyzed CTA membrane.

Left: the pristine CTA membrane; Right: the hydrolyzed CTA membrane.

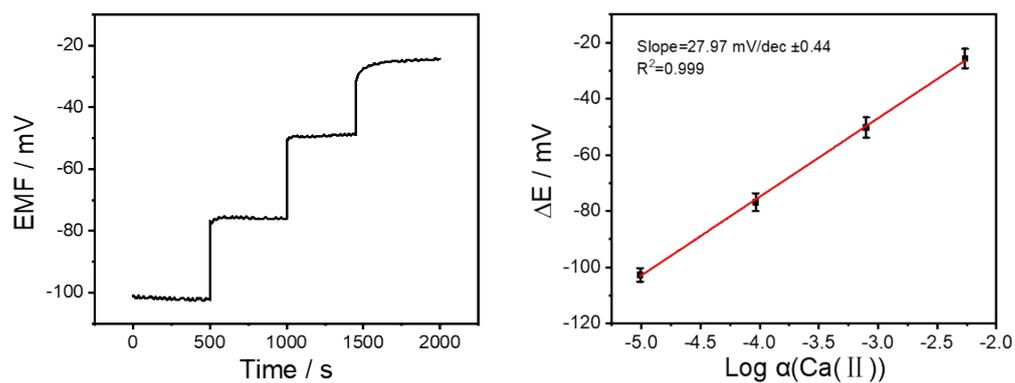


Fig. S5. Response performances of the hydroxylated CTA-based Ca^{2+} -selective electrode. The dynamic potential responses (left) and the corresponding calibration curve (right) for the hydroxylated CTA-based Ca^{2+} -selective electrode. Error bar represents one standard deviation for three measurements.

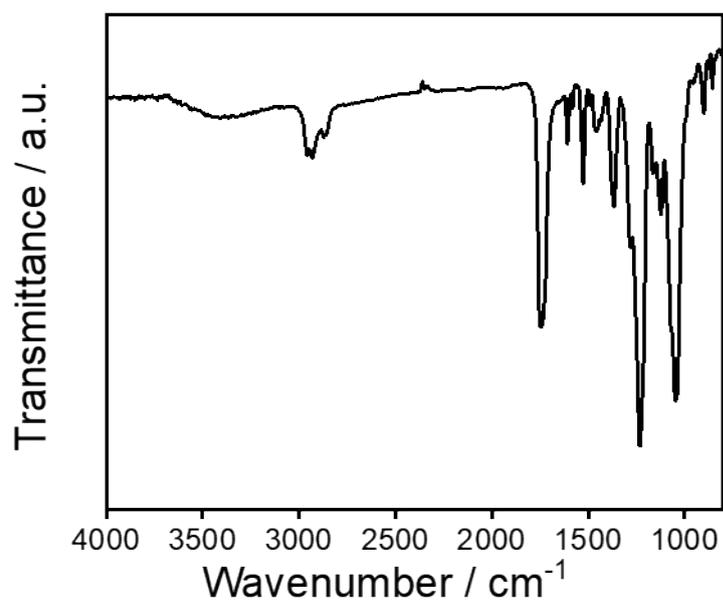


Fig. S6. ATR-FT-IR spectra of the CTA membrane grafted with butyrylcholinesterase.

Table S1. Logarithmic potentiometric selectivity coefficients of the CTA membrane Ca^{2+} -ISEs based on different plasticizers including *o*-NPOE, DOS, DOA, DOP, DBP and FPNPE.

<i>Ion j</i>	$\log K_{\text{Ca},j}^{\text{pot}}$					
	<i>o</i> -NPOE	DOS	DOA	DOP	DBP	FPNPE
K⁺	-9.1 ± 0.1	-5.9 ± 0.3	-4.7 ± 0.9	-6.6 ± 0.1	-5.8 ± 0.8	-7.6 ± 0.3
Na⁺	-8.4 ± 0.1	-5.4 ± 0.3	-4.4 ± 0.9	-6.7 ± 0.3	-5.2 ± 0.9	-6.3 ± 0.3
Mg²⁺	-9.1 ± 0.1	-8.3 ± 0.1	-7.2 ± 0.9	-8.6 ± 0.1	-8.1 ± 0.6	-8.0 ± 0.2
H⁺	-6.6 ± 0.1	-5.5 ± 0.3	-4.6 ± 0.6	-5.7 ± 0.1	-5.0 ± 0.8	-6.5 ± 0.2

Table S2. Oxygen atom percent of carbonyl and hydroxyl groups and hydroxyl conversion of CTA film after CTA hydrolysis by using 1.0 M NaOH.

CTA percentage of carbonyl oxygen atoms O1 (%)	CTA percentage of hydroxyl oxygen atoms O2 (%)	Percentage of hydroxyl oxygen atoms of CTA membranes after hydrolysis with 1 M NaOH O3 (%)	Hydroxyl conversion* (%)
58.43	41.57	75.37	57.85

*Conversion rate = $(O3-O2) / O1 \times 100\%$