Electronic Supplementary Information

Interfacial nano-mixing in a miniaturized platform enables signal enhancement and in-situ detection of cancer biomarkers

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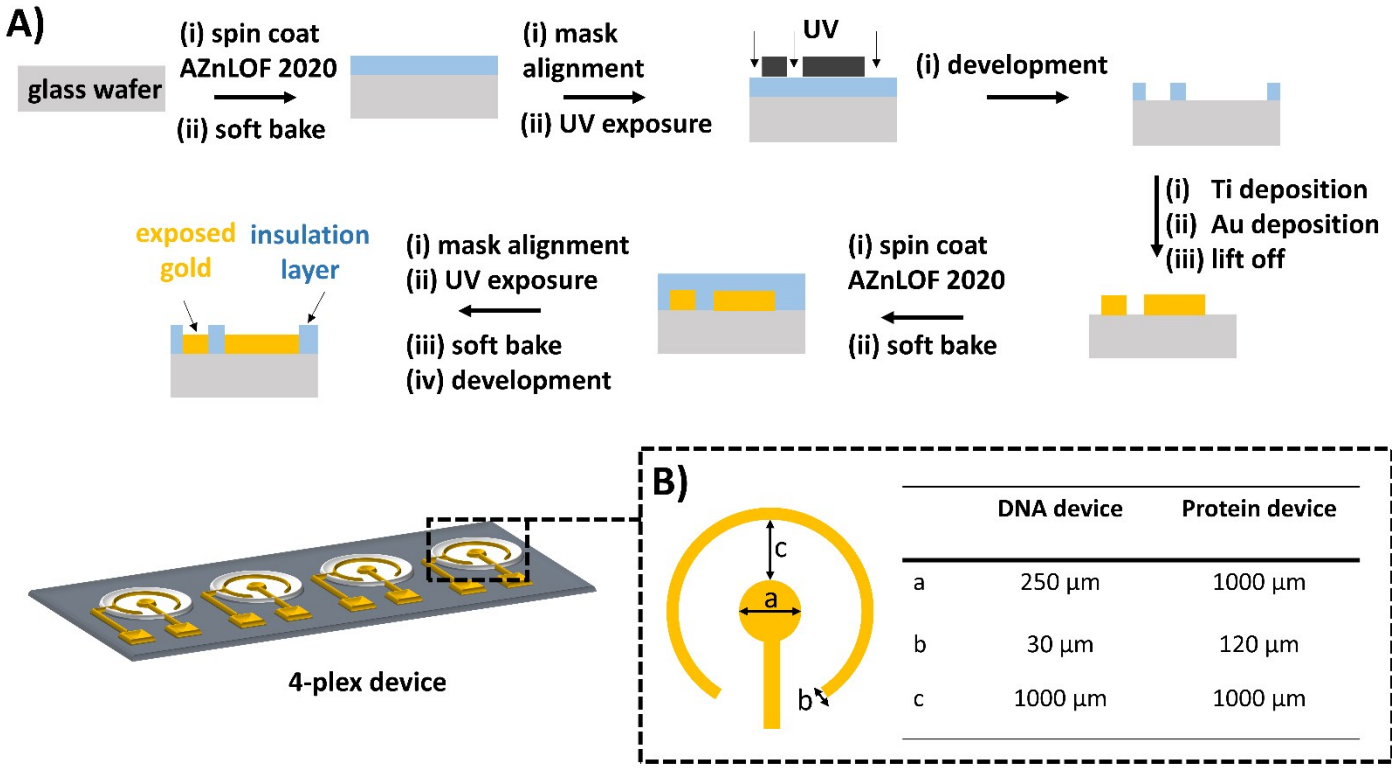
Figure S1.



	DNA device	Protein device
a	250 µm	1000 µm
b	30 µm	120 µm
c	1000 µm	1000 µm

Figure S1. (A) Schematic representation of the fabrication of nanomixing-enhanced 4-plex device. (B) Shows the dimensions of the asymmetric electrodes used for the DNA and protein device.

Figure S2

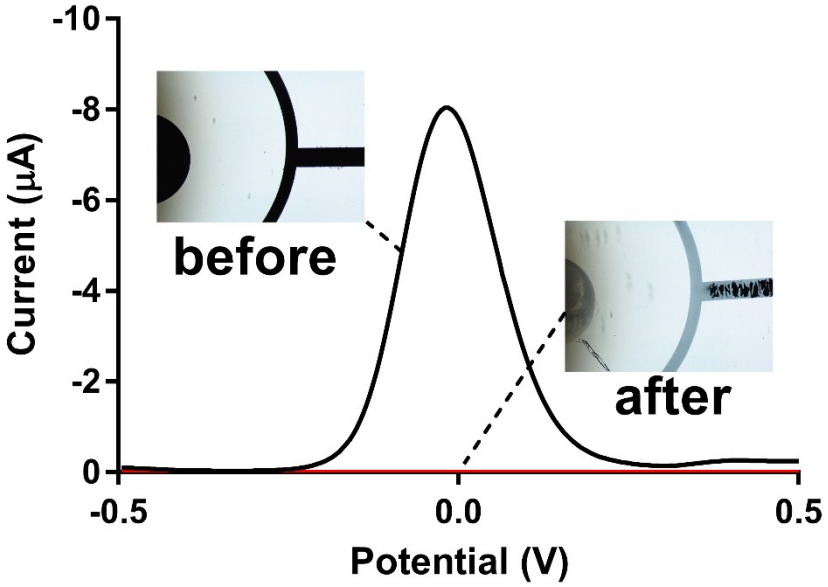


Figure S2. Damage of the biosensor due to voltage application. The voltammograms before (baseline, black) and after nanomixing for 10 min at 10 V (red). The inset show the brightfield microscope images of the same sensor before and after nanomixing.

Figure S3

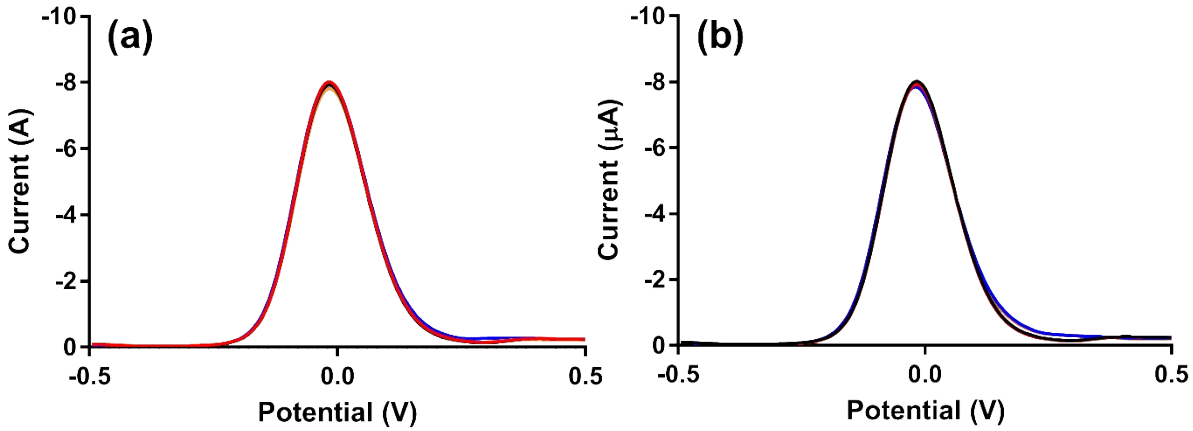


Figure S3 shows the effect of repeated nanomixing on the electrochemical read-out using (a) the protein buffer and (b) DNA buffer. Overlaid voltammograms of three repeated nanomixing cycles on the same electrode. Nanomixing was performed in (a) and (b) for 3min/1.5 V/500 Hz and 3min/0.8 V/500 Hz.

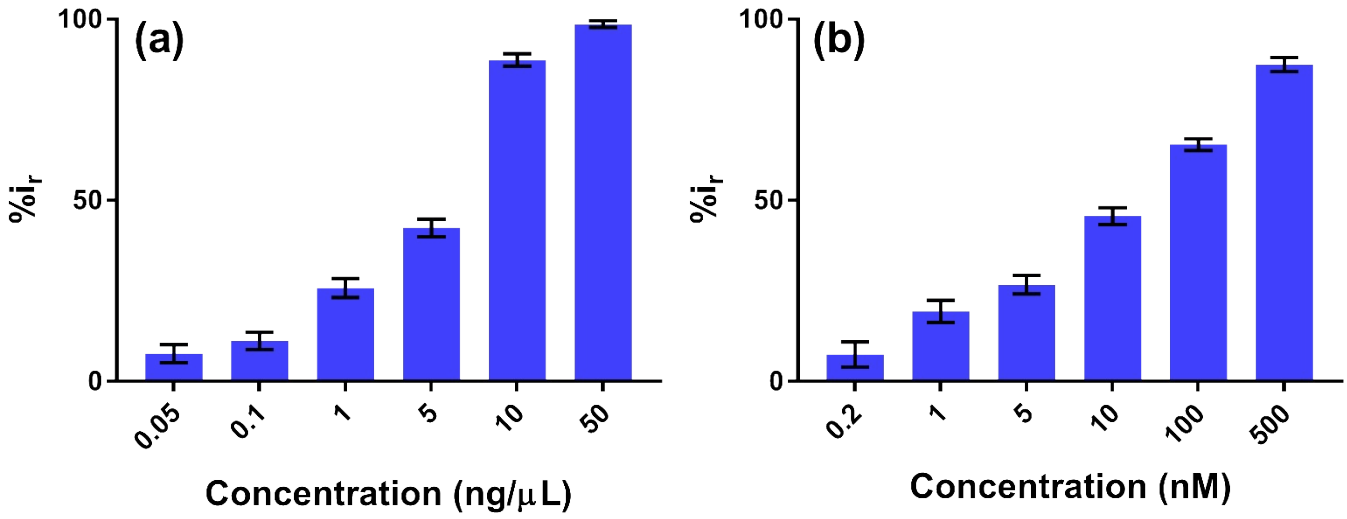


Figure S4

Figure S4. Dynamic range of nanomixing-enhanced sensor for the detection of (a) BSA and (b) synthetic DNA.

Figure S5.

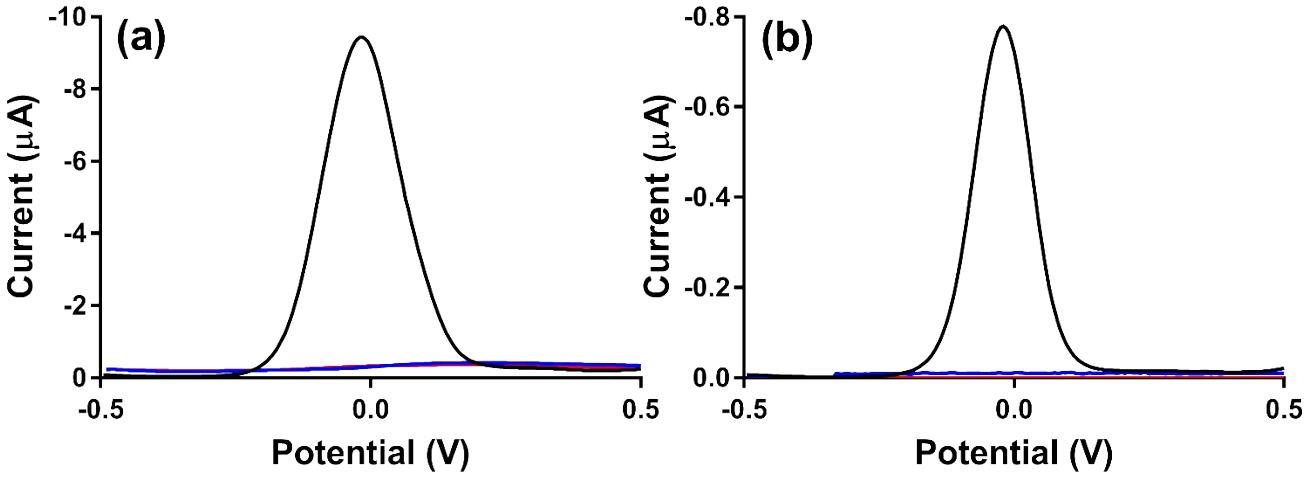


Figure S5. Saturation of the enhanced biosensor. In (a), the concentration of EGFR (red) and phosphorylated EGFR (blue) was 10 ng/μL. In (b), the concentration of DNA (red) and methylated DNA (blue) was 5 ng/μL. The baseline is shown in black.

Table S1

Description	Sequence
Region of interest from EN1 gene	5'-TTGGTGCCCTGCGCTCCGGGGCTCCCCGCG CCGCCTCCACTGCCGCCGCCACCG-3'
Forward primer for asymmetric PCR of EN1 region	5'-ATTCAGTCCACAACAAYGTTGGTTGAG TTTATAAGTAGGATAGT-3'
Reverse primer for asymmetric PCR of EN1 region	5'-ACRACCRCAACAACCAAACCCT-3
Synthetic DNA	5'-GATAACGACGACAATAAAAACGACGCGAA AAACCCCGAAACGCAAAACACCAA-3'