

Supporting Information

Biomimetic Nanochannel-ionchannel Hybrid for Ultrasensitive and Label-Free Detection of MicroRNA in Cells

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Supporting Information Table of Contents

Supplementary Figure S1. SEM image of cross section of PAA.....	S-3
Supplementary Figure S2. Fluorescence emission spectra of samples in ionchannel side and nanochannel side.	S-3
Supplementary Figure S3. The whole XPS spectra for the modified and unmodified PAA.....	S-4
Supplementary Figure S4. The LSCM cross-sectional image of the APTMS-modified PAA.....	S-4
Supplementary Figure S5. The zeta potential of ssDNA and miRNA-ssDNA complex.....	S-5
Supplementary Table S1. Comparison of the performance of various sensing systems for the detection of miRNAs.....	S-6

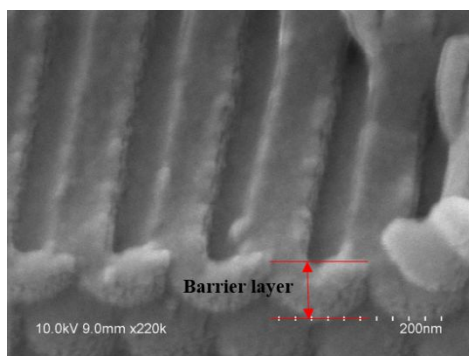


Figure S1. SEM image of cross section of PAA. The marked part is the barrier layer of PAA.

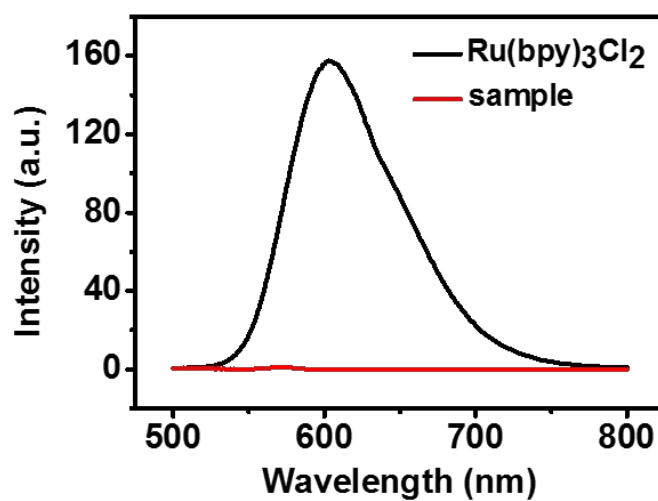


Figure S2. Fluorescence emission spectra of samples in ionchannel side and nanochannel side. The black curve is the solution of 1 μM $\text{Ru}(\text{bpy})_3\text{Cl}_2$ and the red curve is sample of the ionchannel side.

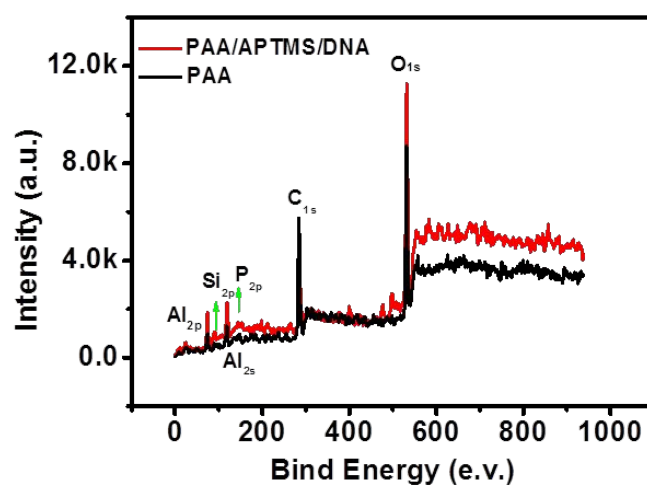


Figure S3. The whole XPS spectra for the modified (red line) and unmodified (black line) PAA samples showed above.

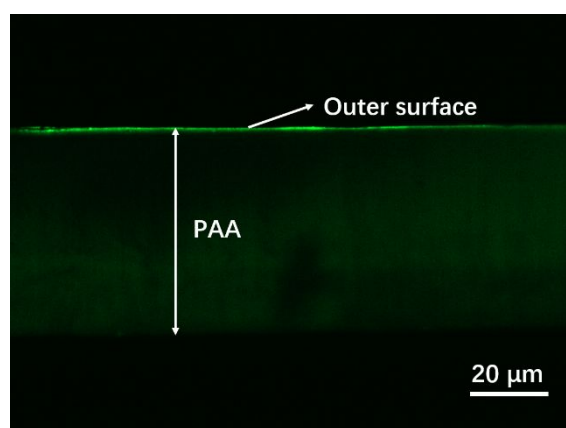


Figure S4. The LSCM cross-sectional image of the APTMS-modified PAA.

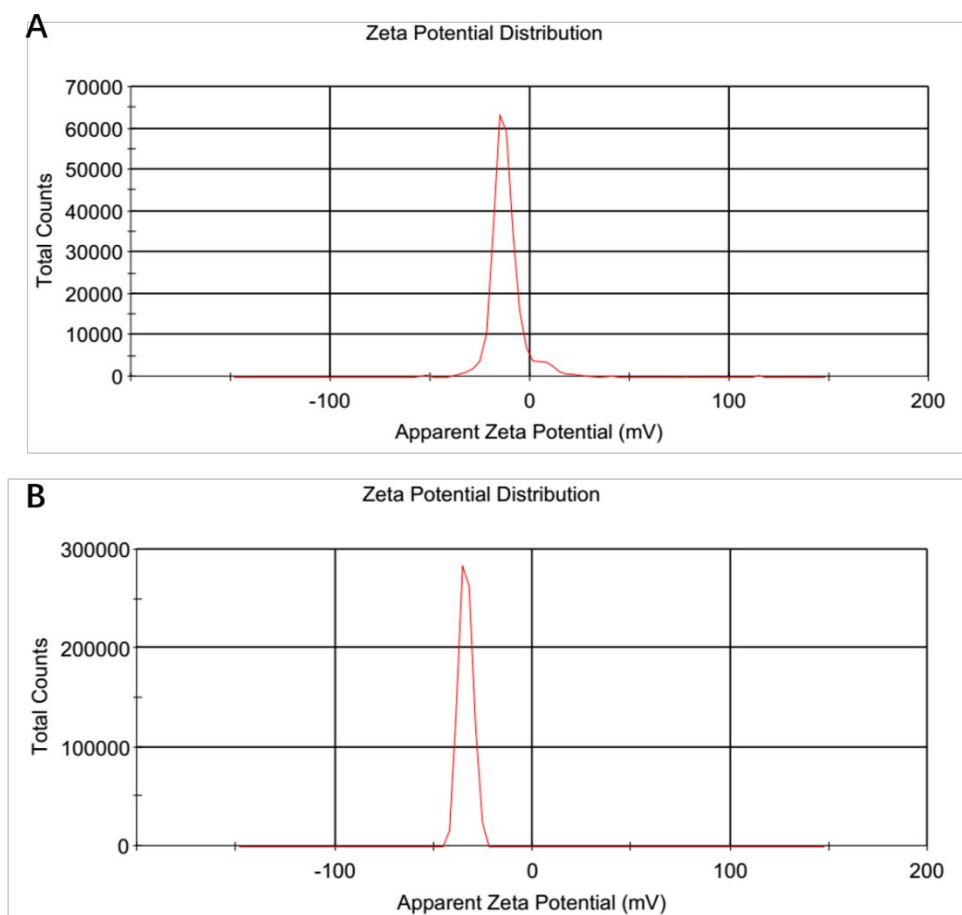


Figure S5. The zeta potential of ssDNA (A) and miRNA-ssDNA complex (B).

Table S1. Comparison of the performance of various sensing systems for the detection of miRNAs.

Detection Method	RNA sensor	Detection limit	Linear range	Reference
POTC	cyclic SDR	7.6fM	10fM-10pM	S1
Fluorescence	Au NPs quenching	3.8pM	3.8pM-5nM	S2
Electrical signal	nanopore	1fM	1fM-10fM	S3
SERS	DNA-conjugated Ag-HMSs	10fM	100fM-0.1μM	S4
CV	probe/magnetic beads	10 fM	5fM-5pM	S5
Electrochemiluminescence	g-C3N4 NS	500aM	1fM-1nM	S6
Northern blotting	protein/Microarray	10 pM	10pM-500 pM	S7
fluorescence	aptamer/sulforhodamine	0.3 nM	1 nM-5 μM	S8
SPR	Au@Ag NR	50aM	50 aM-0.1nM	S9
SERS	DSNSA	5fM	12 fM-18 pM	S10
photocurrent	p19 protein/probe RNA	153 fM	350 fM-5 nM	S11
EIS	DSNATR	60 aM	0.5 fM-40 fM	S12
LSV	ssDNA/PAA	15.4 aM	0.1fM-0.1μM	This work

POTC: point-of-care testing; SDR: cyclic strand displacement reaction; SERS: surface-enhanced raman scattering; HMSs: hollow silver microspheres; CV: cyclic voltammetry; g-C3N4 NS:graphite-like carbon nitride nanosheet; SPR: surface plasmon resonance; Au@Ag NR: silver coated gold nanorods; DSNSA: duplex-specific

nuclease signal amplification; EIS: Electrochemical impedance spectroscopy; DSNATR: duplex-specific nuclease assisted target recycling; LSV: linear sweep voltammetry

Reference

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