Supporting Information for

A temperature, pH and sugar triple-stimuli-responsive nanofluidic diode

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The characterization of a single glass conical nanopore

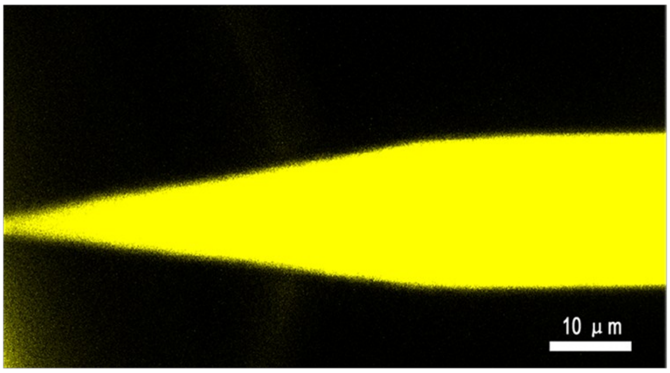

Fig. S1 Profile of a single conical nanopore channel in a glass capillary filled with 100 μmol/L R6G water solution (with a 250 nm orifice radius).

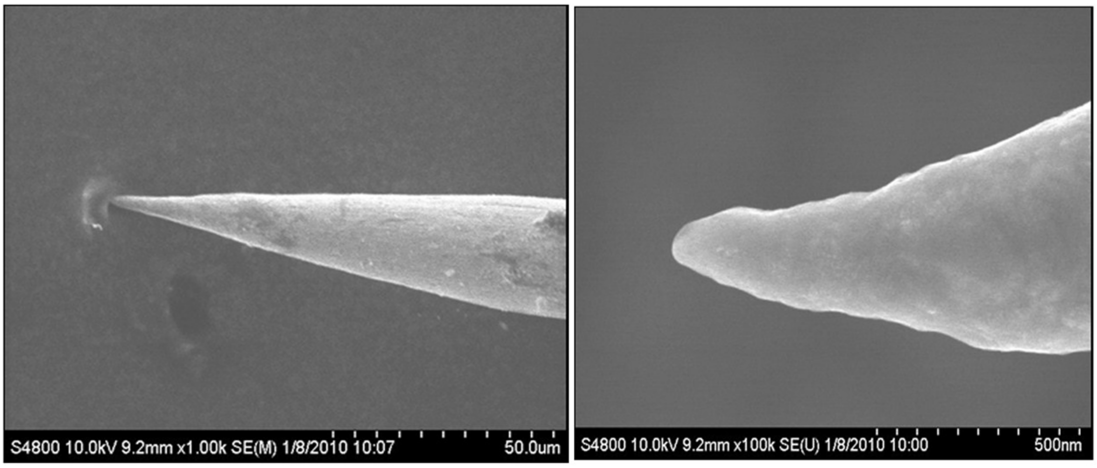

Fig. S2 The SEM image of the Pt tip.

Monitoring the fabrication process of P(DMAEMA-co-VPBA):

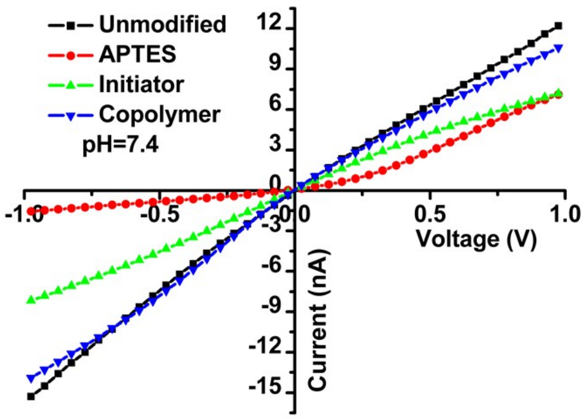

Fig. S3 Characterization of the modification procedure on a single glass conical nanopore channel (22 nm in orifice radius) by recording I–V curves at pH=7.4 (10 mM KCl electrolyte).

Stimuli-modulated ion transport

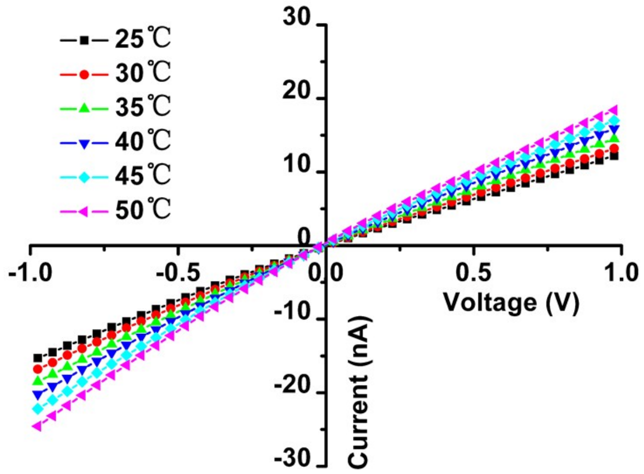

Fig. S4 I–V curve of a single glass conical nanopore channel (22 nm in orifice radius) without modification in 10 mM KCl (pH=7.4).

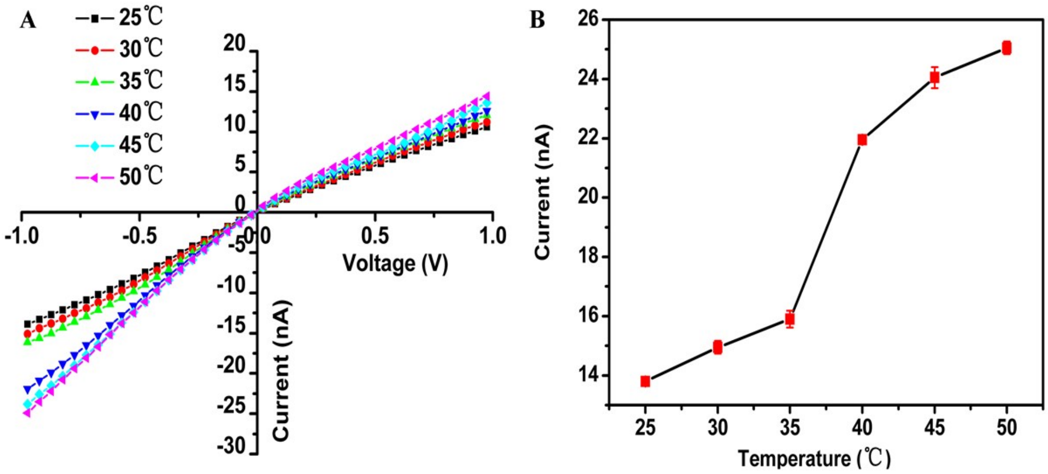

Fig. S5 (A) I–V curve of a single glass conical nanopore (22 nm in orifice radius) with P(DMAEMA-co-VPBA) modification in 10 mM KCl (pH=7.4). (B) The relationship between the ionic current and temperature of the nanopore modified by P(DMAEMA-co-VPBA) at –1 V in pH=7.4 (10 mM KCl electrolyte).

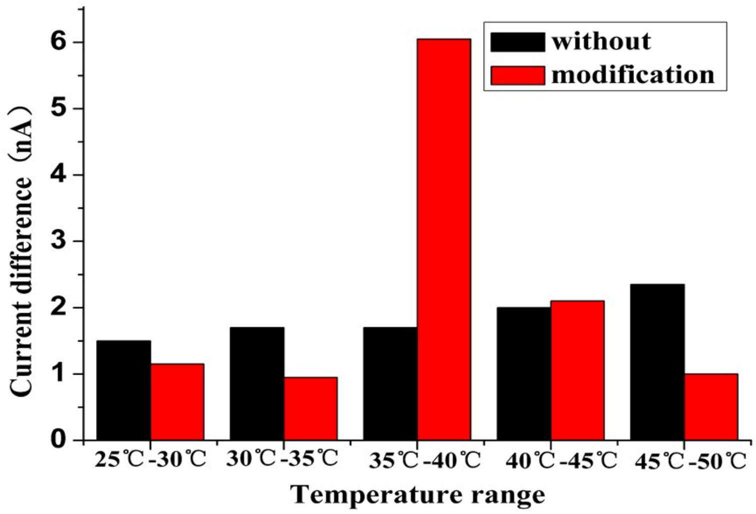

Fig. S6 The current difference of the nanofluidic device between five-degree temperature intervals at -1 V.

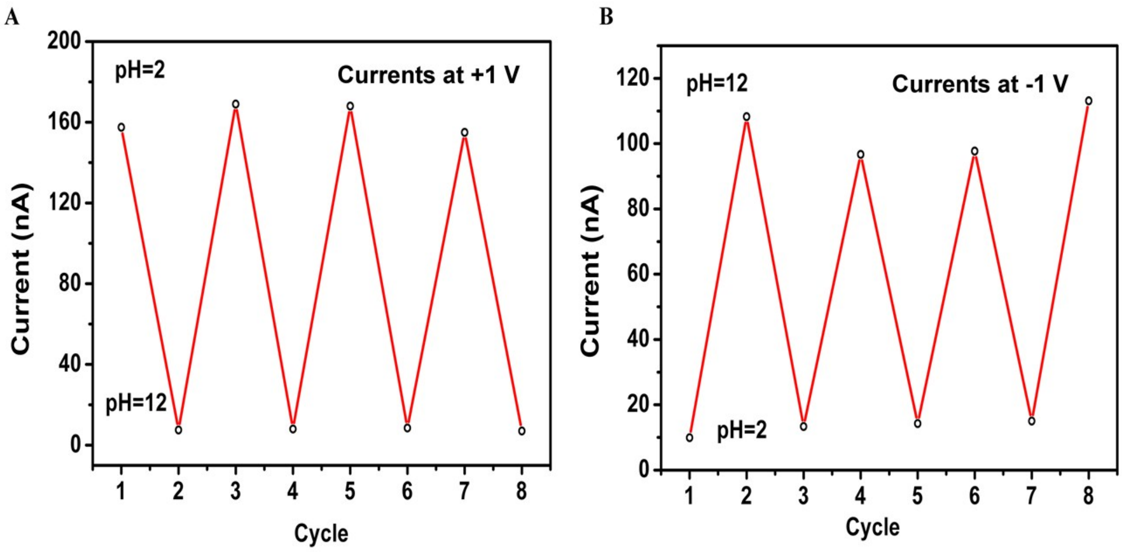

Fig. S7 Reversible variation of the current of a single glass conical nanopore channel (with ~ 22 nm orifice radius) modified with P (DMAEMA-co-VPBA) upon switching the pH between 2 and 12 recorded at (A) +1 V and (B) –1 V.

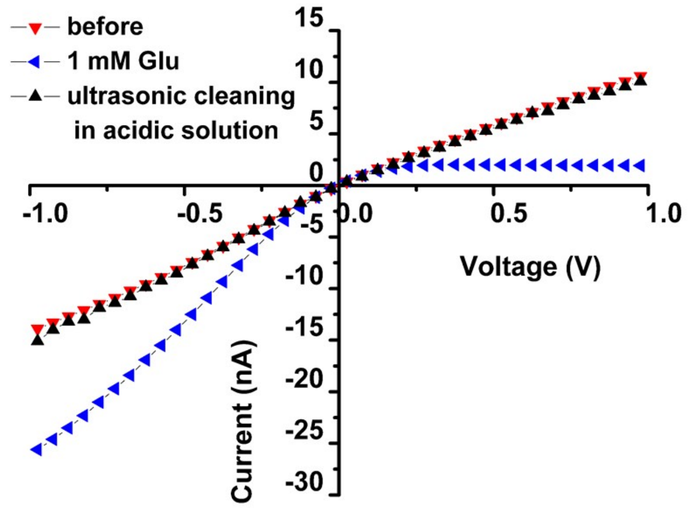

Fig. S8 I–V curves for 10 mM KCl solutions in a nanochannel (~22 nm in orifice radius): a P(DMAEMA-co-VPBA)-modified nanochannel (red triangle point line), after addition of 1 mM glucose (blue triangle point line) and after ultrasonic cleaning in acidic solution (black triangle point line).