Supplementary Information

Ultra-Low Noise Amplifier Array System for High Throughput Single Entity Analysis

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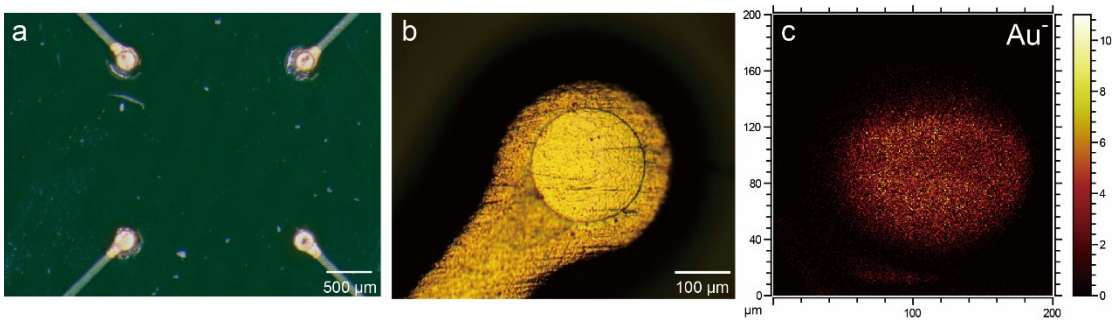

Fig S1. Characterizations of Au electrode array. (a) Microscopy image of four-channel Au electrode array; **(b)** Microscopy image of a single Au electrode; **(c)** ToF-SIMS chemical mapping of Au^- from a single Au electrode. The analysis was performed in a ToF-SIMS V instrument (ION-TOF GmbH, Germany) equipped with a bismuth liquid metal ion gun. The image was recorded using a pulsed 30 keV Bi^+ primary ion beam in negative mode and an electron flood gun was used for charge neutralization.

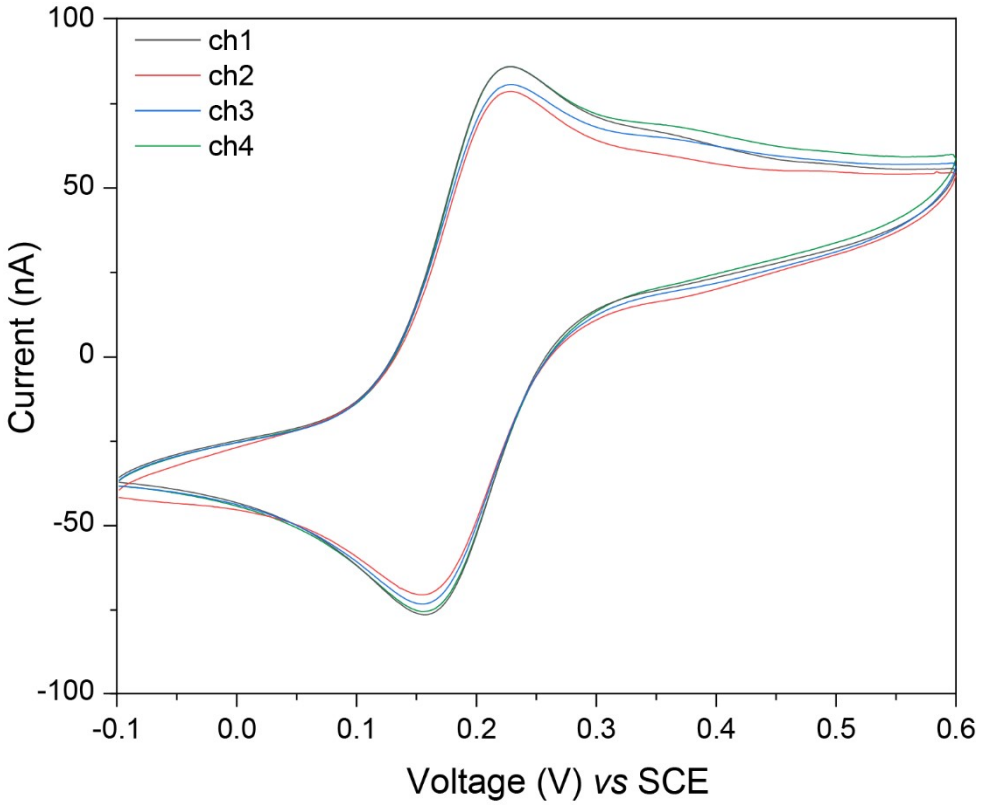

Fig S2. Cyclic voltammograms of Au electrode array. The cyclic voltammograms of four-channel Au electrode in 9 mM ferrocene and 1 M KNO_3 at a scan rate of 10 mV/s.

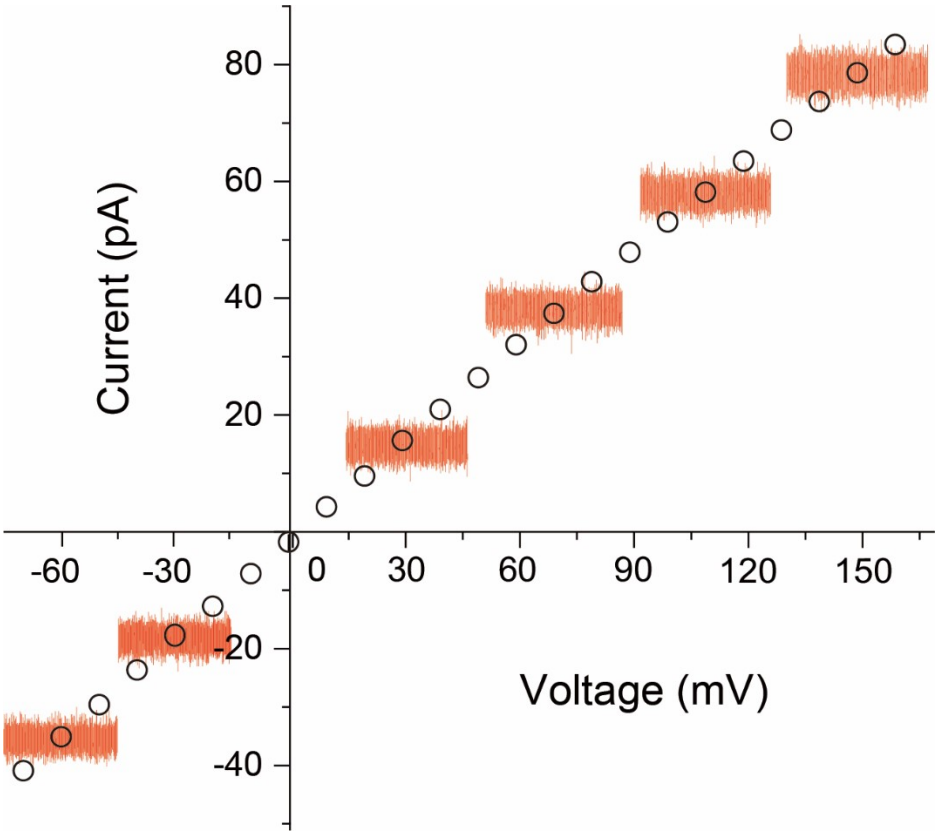

Fig S3. I-V curve of wild-type Aerolysin nanopore. The data was acquired in the condition of 1.0 M KCl, 10 mM Tris, and 1.0 mM EDTA at pH 8.0.

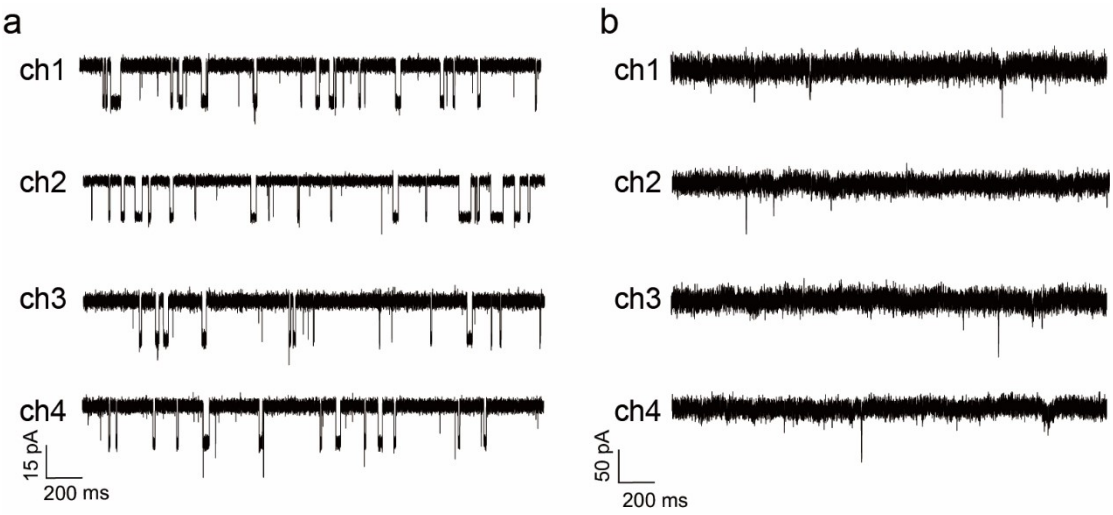

Fig S4. The raw current trace for single-molecule detection and single-entity measurement (a) The four-channel raw current traces from single-molecule detection with aerolysin nanopores. The data was acquired in 1.0 M KCl, 10 mM Tris and 1.0 mM EDTA at pH 8.0 and +100 mV. (b) Four-channel raw current responses of 3-nm-Pt NPs collisions at Au electrode array under -300 mV vs. Ag/AgCl in 10 mM $HClO_4$, filtered by 1 kHz low-pass filter.