Supporting information

Quantitative Detection of the Influenza A Virus by an EGOFET-Based Portable Device

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Content:

1. Solvents and materials

Organic solvents (toluene, dimethylsulfoxide, acetone, isopropanol) were purchased from Acros Organics. Polystyrene (PS) Mw =280 000 was purchased from Sigma-Aldrich and used as received. Ultrapure deionized (DI) water with a resistance of 18.2 MΩ was obtained using an Akvilon deionizer D-301 (Russia). Poly(dimethylsiloxane) (PDMS) reservoir was produced using Ecoflex 0-50 rubber obtained from Smooth-On (USA). Phosphate buffered saline (PBS 10 mM, pH 7.4) tablets were from Ecoservice, Russia.

2. Biopreparation details

The following influenza strains were studied: A/chicken/Rostock/45/1934(H7N1)5th passage 60 and Newcastle Disease virus (NDV), influenza B virus, allantoic fluid. Virus stocks were propagated in the allantoic cavity of 10-day-old embryonated specific pathogen free chicken eggs. The eggs were incubated at 37°C, cooled at 4 °C during 48 h post-infection and harvested 16 h later. The study design was approved by the Ethics Committee of the Chumakov Institute of Poliomyelitis and Viral Encephalitides, Moscow, Russia (Approval #4 from 2 December 2014). The viruses were inactivated via the addition of 0.05% (v/v) glutaric aldehyde, preserved via the addition of 0.03% (w/v) NaN_3 and stored at +4°C. The concentrations of the viruses were determined previously using Nanoparticle Tracking Analysis.

For proper exhibition of the functional activity the aptamer RHA0385 was folded at 2 μM concentration in 10 mM PBS to achieve the functional activity. The folding process was carried out in the following way: the solution was heated at 95 °C for 5 min and cooled at room temperature.

3. Preliminary substrate treatment

Glass wafers were used as the substrates for our devices. Preliminary wafers were washed in solvents (acetone and isopropanol) in the ultrasonic bath. Source and drain gold interdigitated electrodes (the channel length was L = 50 μm, the channel width was W = 18230 μm; the calculated ratio W/L = 364.6) were thermally evaporated through a shadow mask.

Substrates with electrodes were subsequently treated with oxygen plasma for 5 seconds and then modified by immersing the wafer for 15 minutes in a 15 mM 2,3,4,5,6-pentafluorothiophenol solution in isopropanol according to [23].

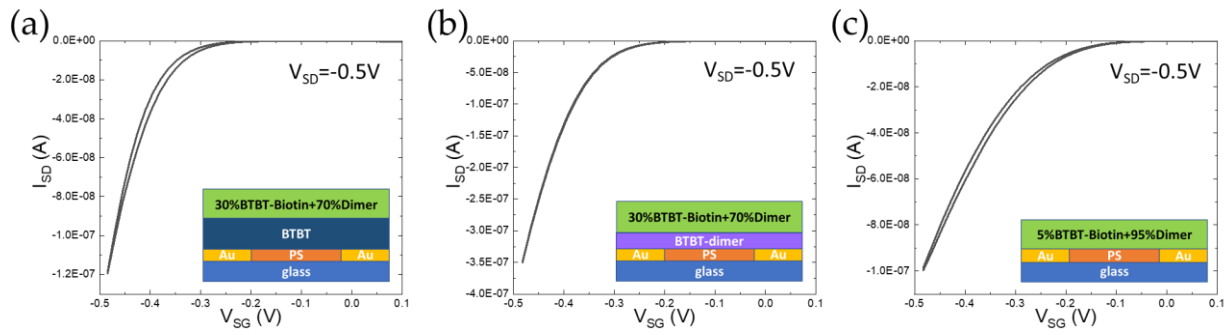

Figure S1. The typical transfer characteristics of epy EGOFET-based biosensor devices manufactured with different OSC sublayers: (**a**) C8-BTBT-C8; (**b**) BTBT-dimer; (**c**) without OSC sublayer.

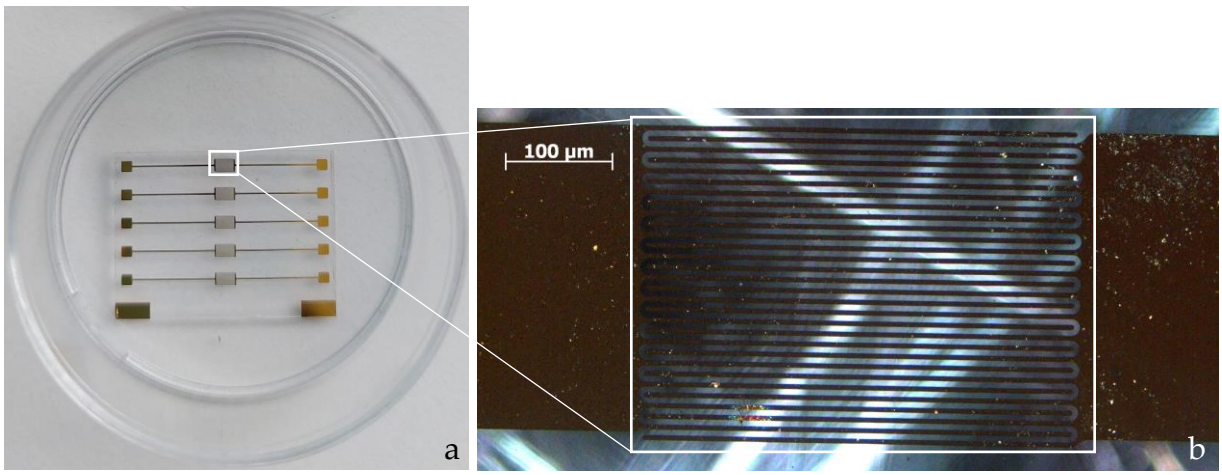

Figure S2. The photograph of the fabricated sensor chip with five EGOFETs on the one glass substrate (left) and polarizing optical microscopy microphotograph of separate EGOFET pixel with interdigitated electrodes covered by functional layers (right).