Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Supporting information

For

Plasma- and anneal-assisted hybridization of SWCNT-Au network for rapid and high-sensitive electrical detection of antibody-antigen interactions

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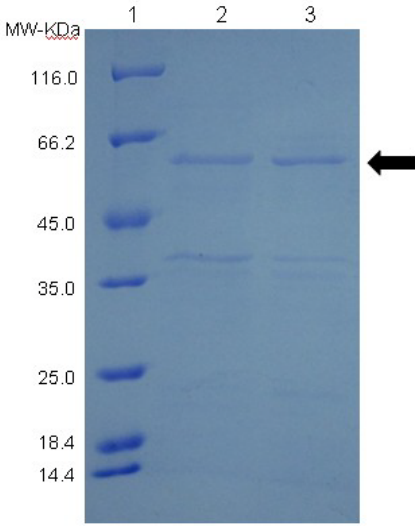

Figure S1. SDS-PAGE of flagellin preparations from *Salmonella enteritidis*. Lane 1, standard molecular weight protein mixture; Lane 2, purified fraction of *S. enteritidis* flagellin (SEF); Lane 3, purified fraction from ultracentrifugation (100,000g for 1 h). As shown, more pure fraction was obtained after ultracentrifugation because of the removal of impurities.

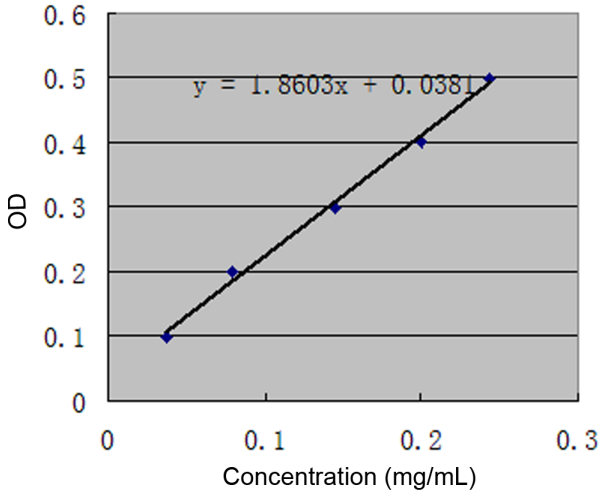

Figure S2. The calculation plot of the absorbance as a function of the SEF concentrations. Tenfold dilution of the stock solution of the SEF has an OD_{550nm} of 0.101, therefore, the concentration of the stock solution is 2.26 ng mL^{-1} according to the equation illustrated in the figure.

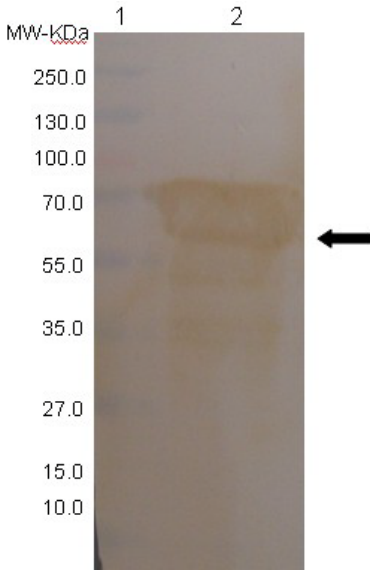

Figure S3. Western blotting identification of the specific binding between anti-SEF and SEF. Lane 1, standard molecular weight protein mixture; Lane 2, the SEF. Western blotting were performed to establish the immunogenicity of anti-SEF on SEF as described in literature [1].

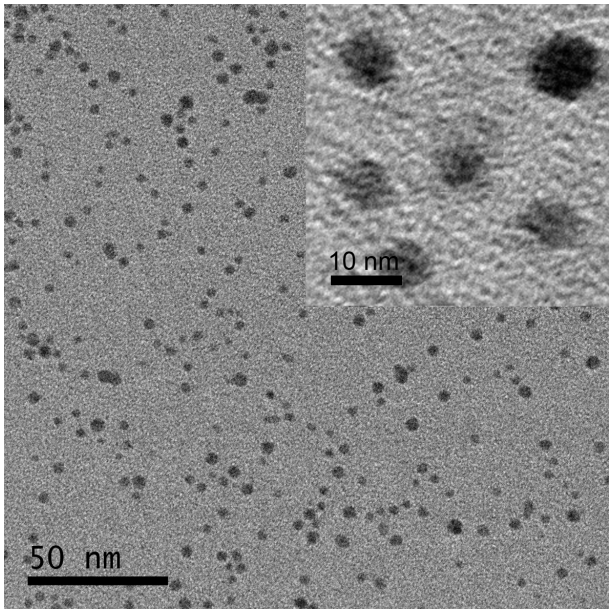

Figure S4. TEM images of the synthesized positively charged gold nanoparticles.

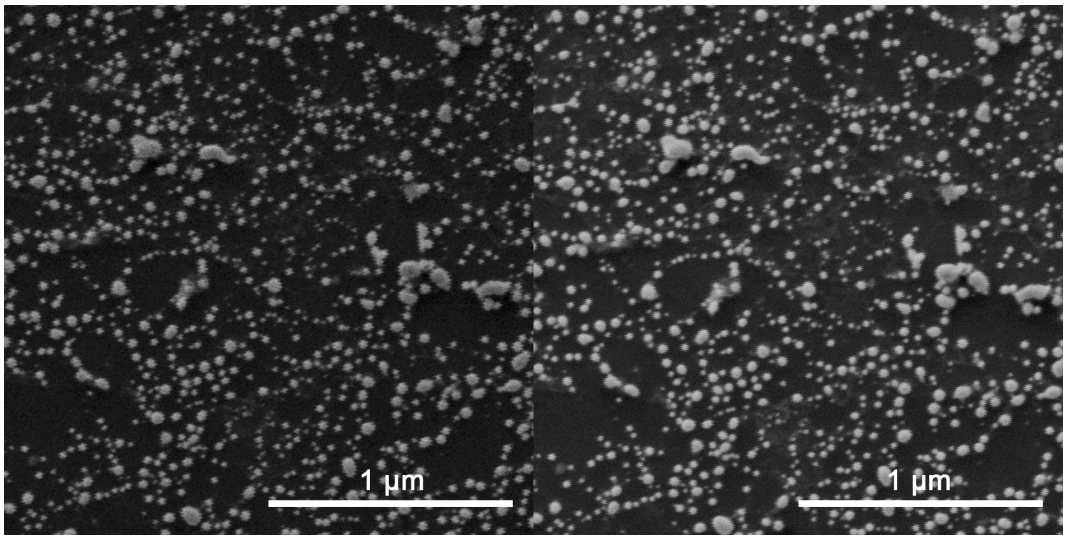

Figure S5. SEM images of a marked area on the annealed microelectrode after the first (left) and second (right) time of immersing the device into PBS buffer for 12 hours, washing with distilled water, and drying in air at room temperature.

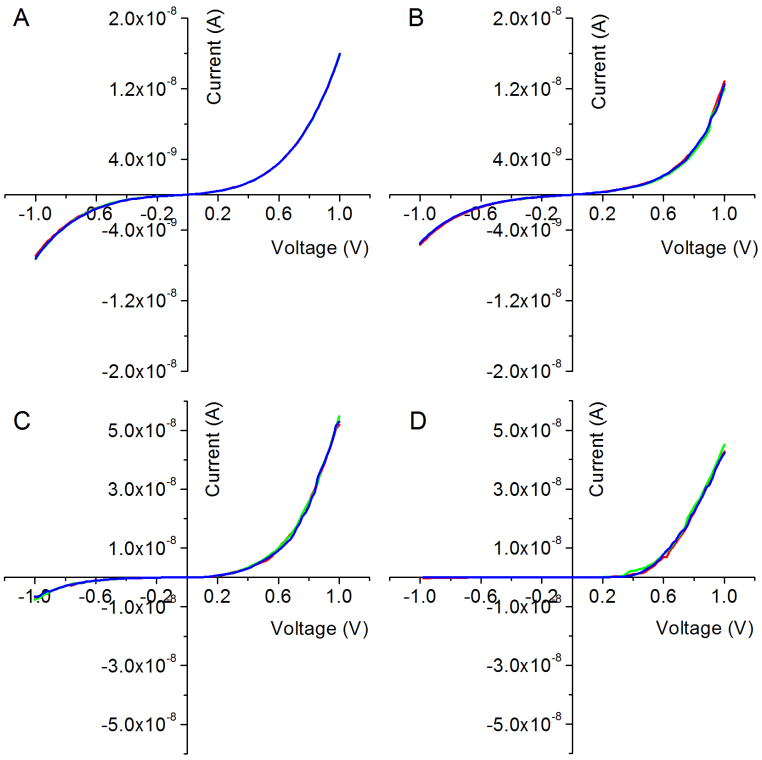

Figure S6. The electrical behaviors of the microelectrodes in different batches after the annealing process at 500°C for 5 min. Triplicate measurements were carried out for each microelectrode.

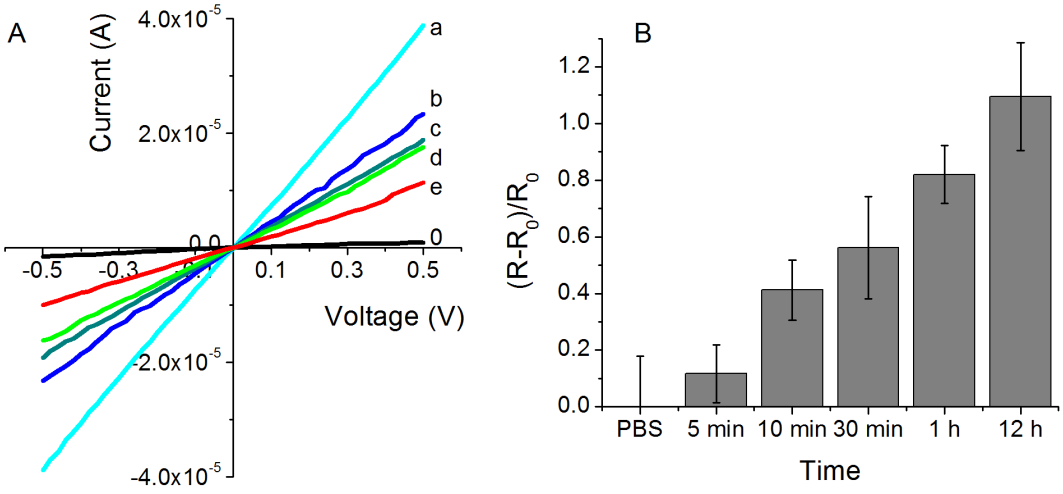

Figure S7. (A) Effects of the annealing at 300°C in a high-purity Ar atmosphere for 1 hour on sequential responses of the sensor during the functionalization and the sensing. 0 and a, the *I-V* responses before and after the annealing, respectively. The resistance, i.e. the reciprocal of the slope of the *I-V* curve, decreased from 0.4 MΩ (before annealing) to 0.01 MΩ (after annealing); b, anti-SEF was immobilized on the SWNT-Au; c, the device was immersed into

0.5% BSA and 0.5% Tween 20 in PSB for 2 hours; d and e, the device was incubated with SEF (2.26 ng mL^{-1}) for 5 min and 1 hour, respectively. (B) Time-dependent responses of the immunosensor after exposure to SEF at a concentration of 2.26 ng mL^{-1}.

References

1. Sherman, P., R. Soni, and H. Yeger, Characterization of flagella purified from enterohemorrhagic, vero-cytotoxin-producing Escherichia coli serotype O157:H7. *J. Clin. Microbiol.*, **1988**. ***26***(7):1367-1372.