**Ultrasensitive and Reproducible Carbon Nanotube Thin Film Biosensors for Whole Virus Detection**

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**ELECTRONIC SUPPLEMENTARY MATERIAL**

The activity of CNT-bound M13-pIII antibody (pIII-ab, New England Lab, MA) on $SiO_2$ wafer was evaluated with enzyme-linked immunosorbent assay (ELISA) with anti-mouse IgG antibody. A block of CNT film on a $SiO_2$ wafer was covered with 10 μL M13-pIII Ab solution in 10 mM phosphate buffer (pH 7.5), which contains 150 mM NaCl and 5% glycerol, and incubated at room temperature for 20 min. The M13-pIII Ab solution was diluted 200 times from the commercial stock (1 mg/mL). Unbound M13-pIII Ab was removed by washing the CNT film with 10 mM phosphate buffer (pH 7.5) six-times, followed by coating with 3% BSA at room temperature for 1 hr. After the CNT film was washed with the same phosphate buffer six-times, the CNT film was incubated with anti-mouse secondary antibody Alkaline phosphatase conjugate (AP-anti-mouse-IgG) solution (Cat No: WP20006, Invitrogen, CA) at room temperature for 1 hr. The antibody-bound CNT film was scratched and transferred into an eppendorf tube, which was blocked with 1.0 % BSA in a phosphate buffer containing 150 mM NaCl, 5% glycerol at 4 °C for overnight. 100 μL of Sigma phosphatase substrate pNPP solution (Cat # 104-105, Sigma-Aldrich, ON) was added into the eppendorf tube. The solution was incubated at room temperature for 30 min and then centrifuged for 1 min at 13,000 rpm. 80 μL of the supernatant was transferred into a 96-well ELISA plate, which was coated with BSA in aforementioned procedure. The amount of bound alkaline phosphate was spectroscopically measured at 405 nm. The background absorbance at 405 nm for each reading was subtracted. The CNT film bound with M13-pIII Ab, but without AP-anti-mouse-IgG was used as control.

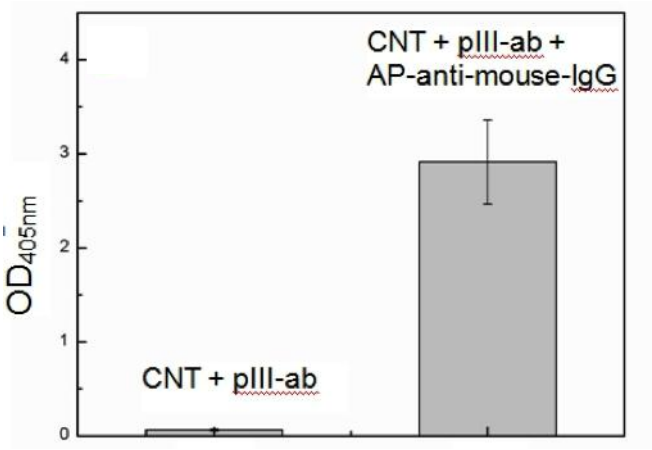


***Figure S1.*** *Activity of M13-pIII Ab absorbed on a CNT film was assayed by ELISA using AP-anti-mouse-IgG and a phosphatase substrate pNPP.*