**Supplementary Information**

**Electrochemical detection of white spot syndrome virus with a silicone rubber disposable electrode composed of graphene quantum dots and gold nanoparticle-embedded polyaniline nanowires**

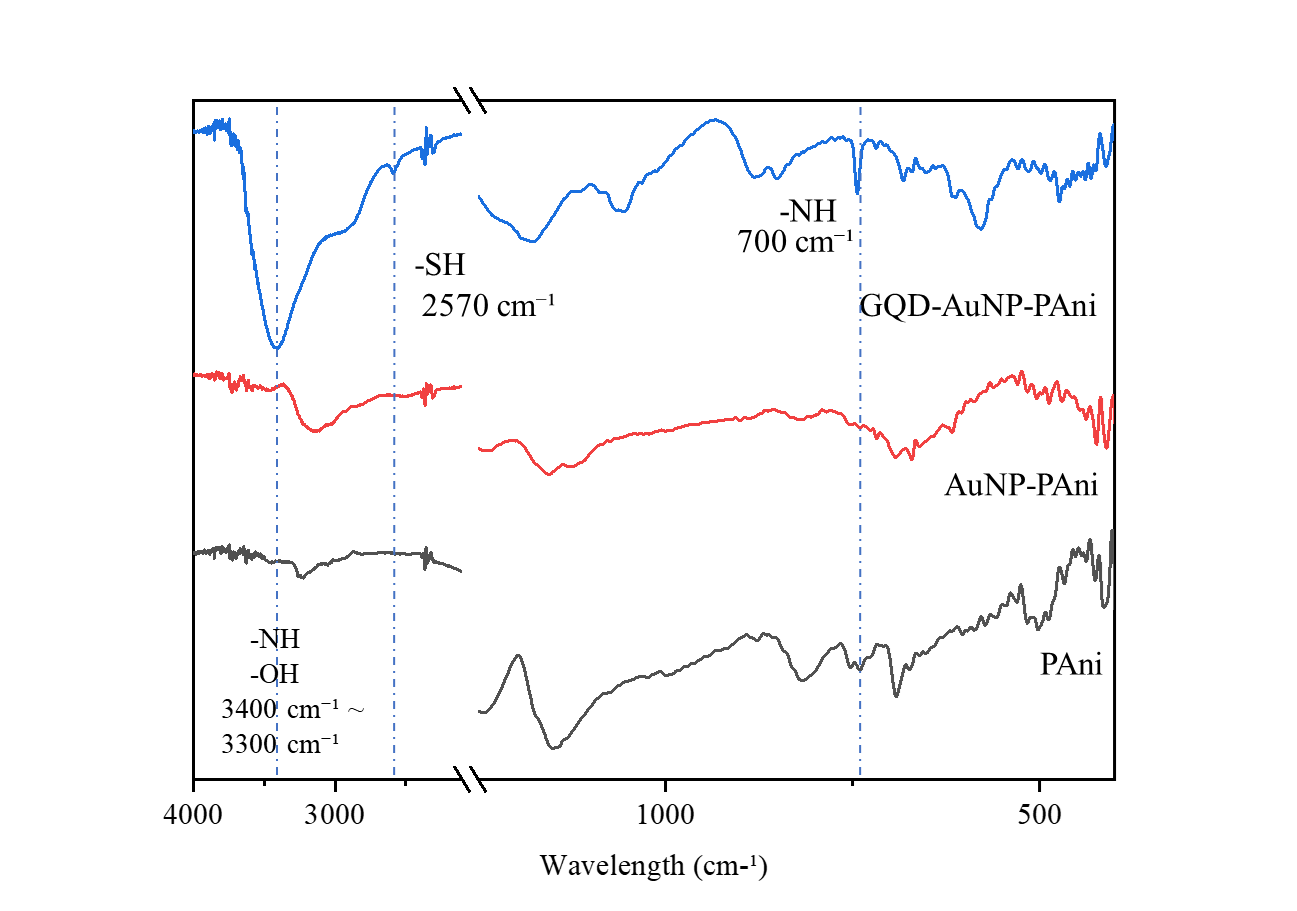
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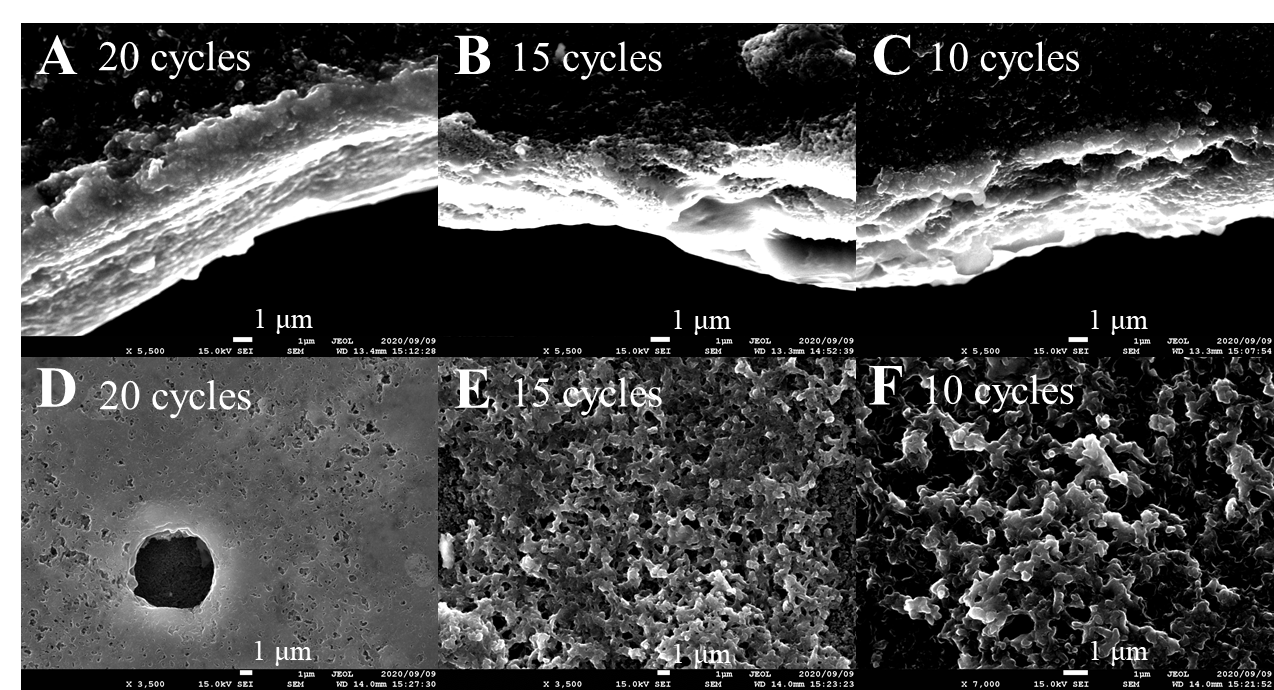
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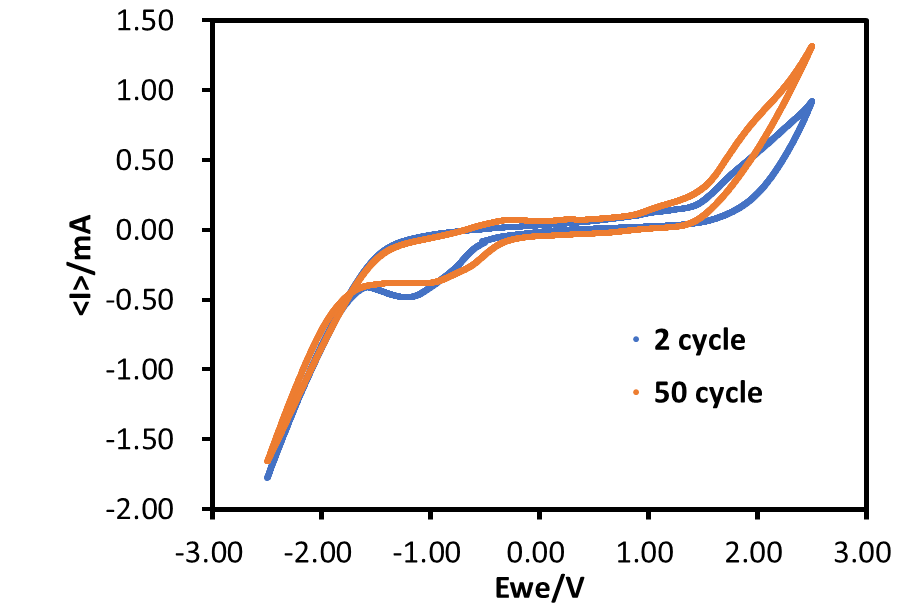
**Fig. S1** Analysis of functional groups on the surface of named materials by FT-IR infrared absorption spectra.



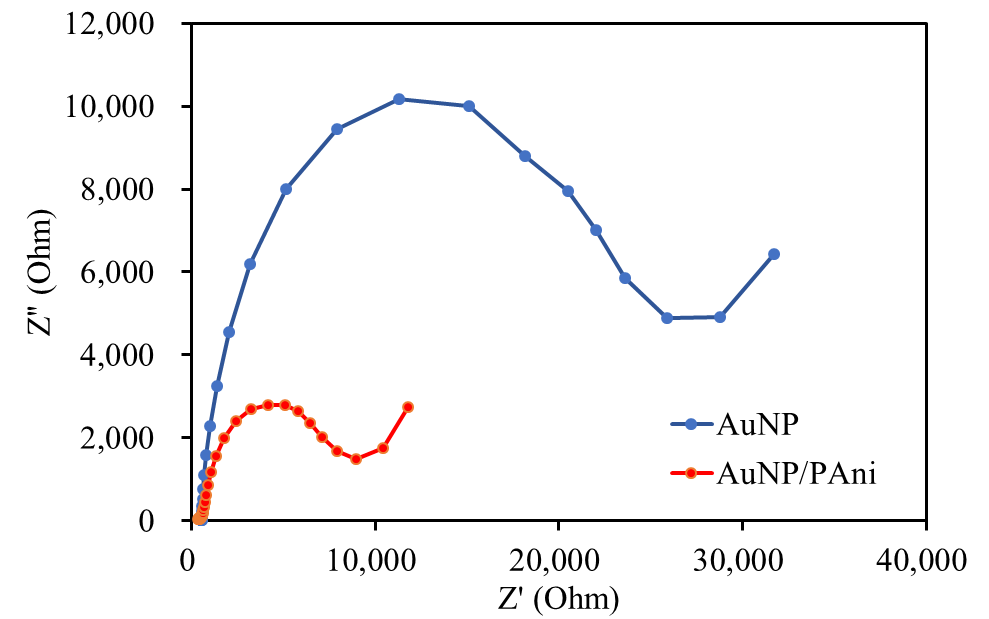
**Fig. S2** Impedance analysis of the PAni/PAni@CSR sensor electrode 5 to 20cycles of electrodeposition.



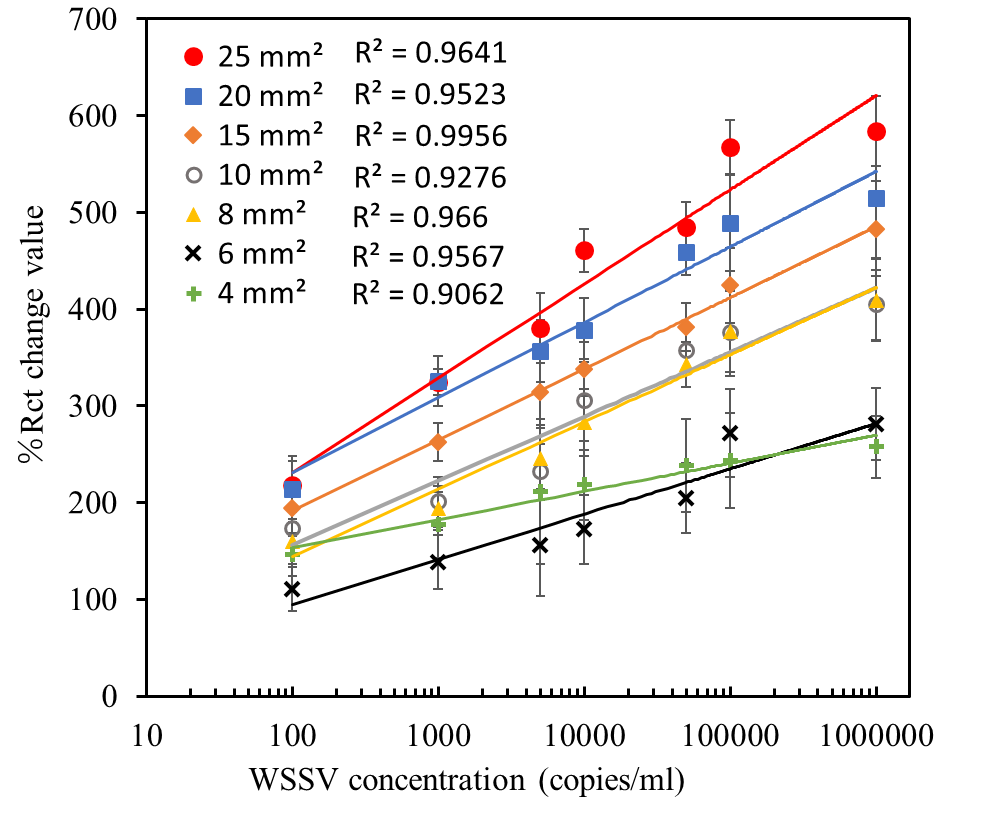
**Fig. S3** (**A–C**) SEM observed the difference in thickness of the polyaniline layer deposited on CSR.



**Fig. S****4** Cyclic voltammetry analysis of the Ab-N,S-GQDs@AuNP-PAni/PAni@CSR sensor electrode 2 to 50cycles.



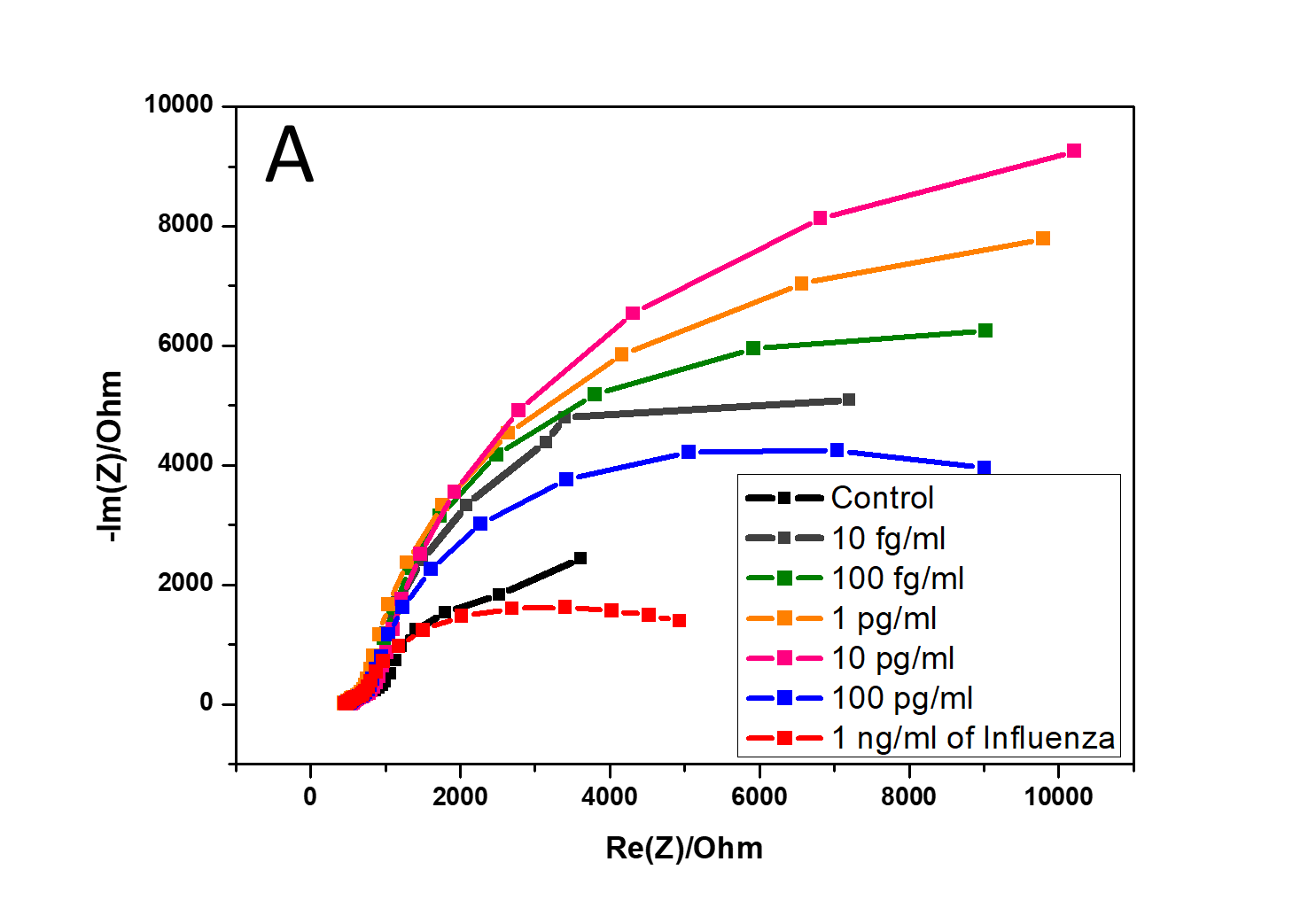
**Fig. S5** Comparison of Rct value with AuNP-modified CSR (blue line) and AuNP/PAni-modified CSR (orange line)

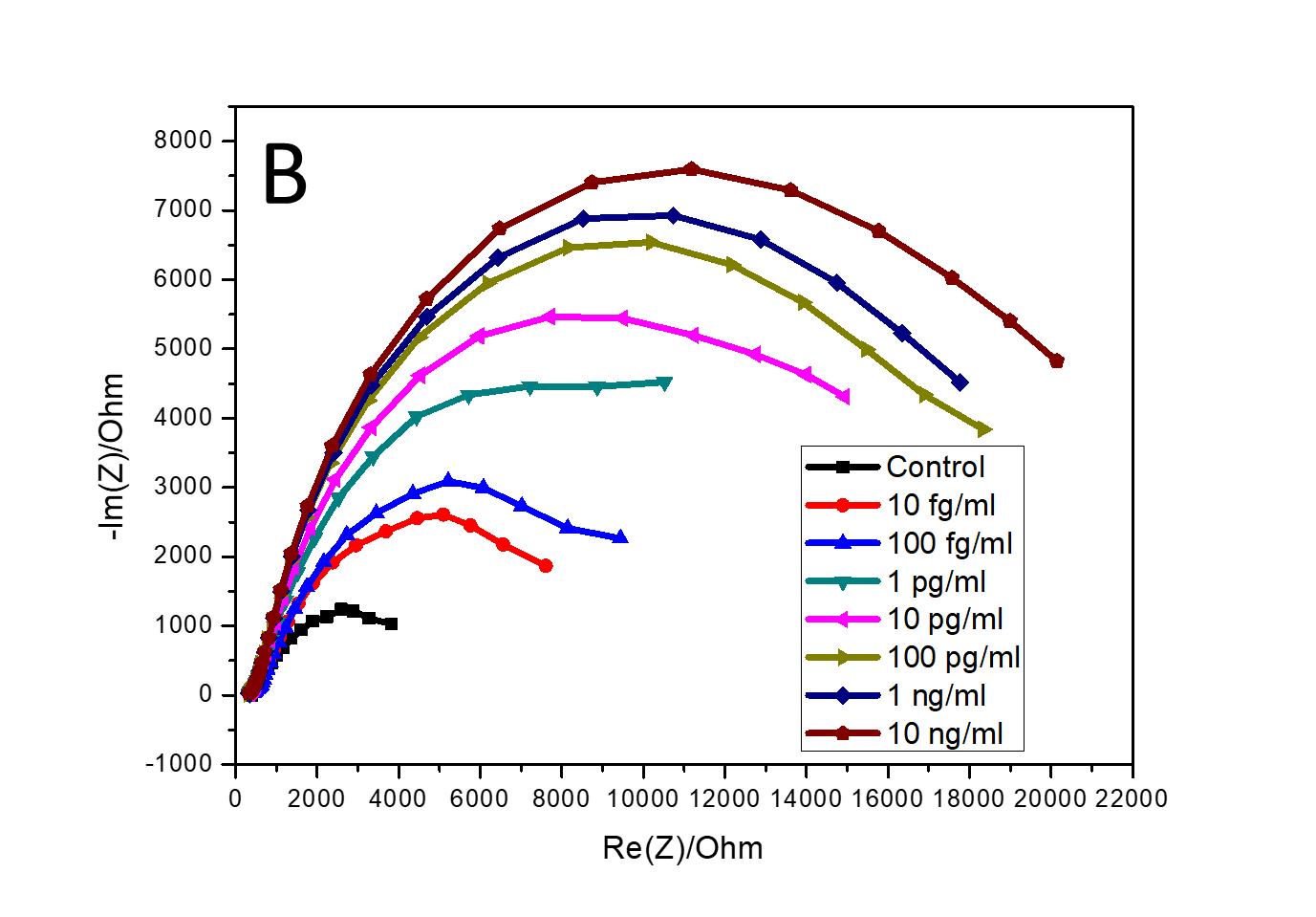


**Fig. S6** Detection result of WSSV using different surface area of Ab-GQD@AuPAni/PAni@CSR.

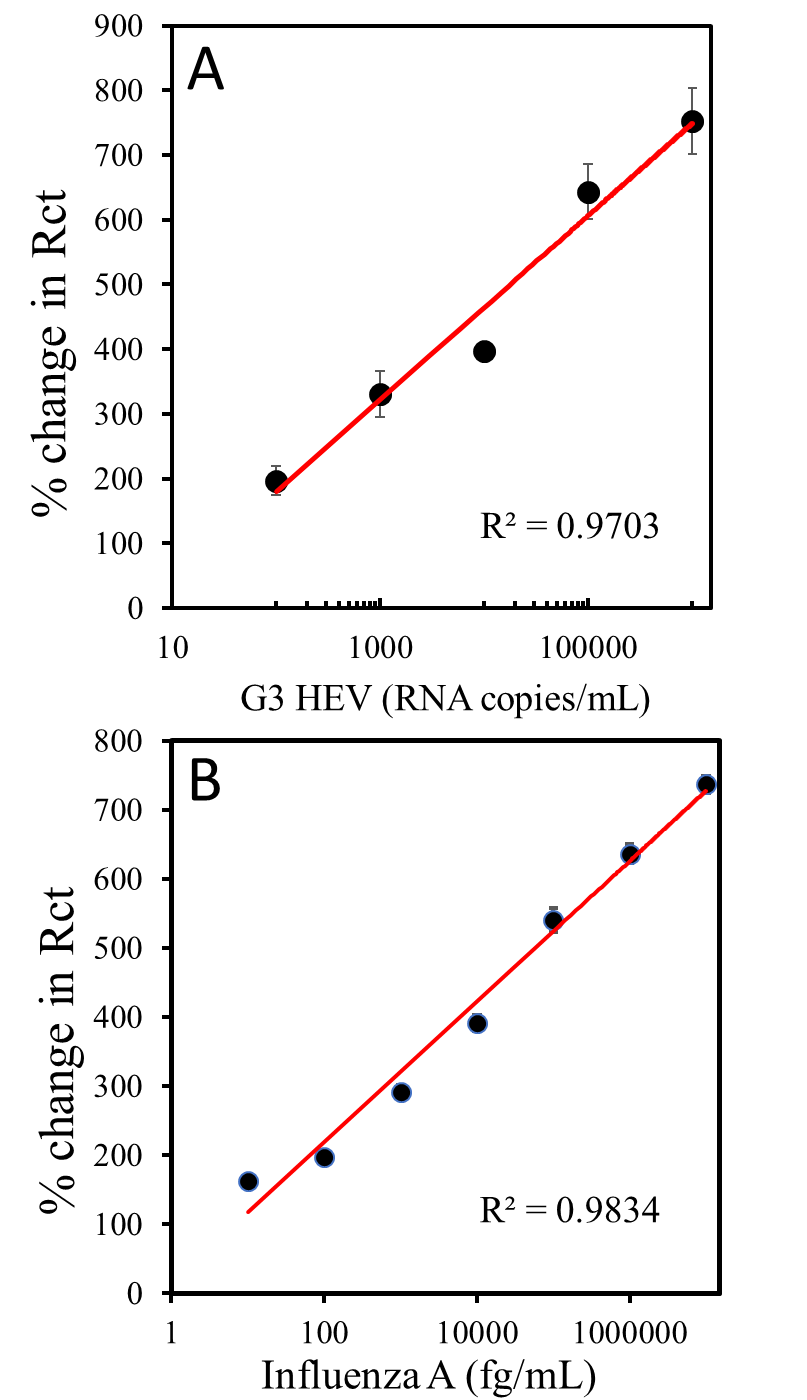


**Fig. S7** AFM images of the bare disposable sensor electrode (A) and with WSSV bound electrode (B).





**Fig. S8** Nyquist impedance plots of the Ab-N,S-GQDs@AuNP-PAni/PAni@CSR sensor electrode before and after loading A) HEV and B) influenza virus.



**Fig. S9** Detection result of the genotype 3 HEV (A) and Influenza virus A (H1N1) (B) using the Ab-GQD@AuNP-PAni/CSR sensor electrode, bound with their corresponding antibodies.

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