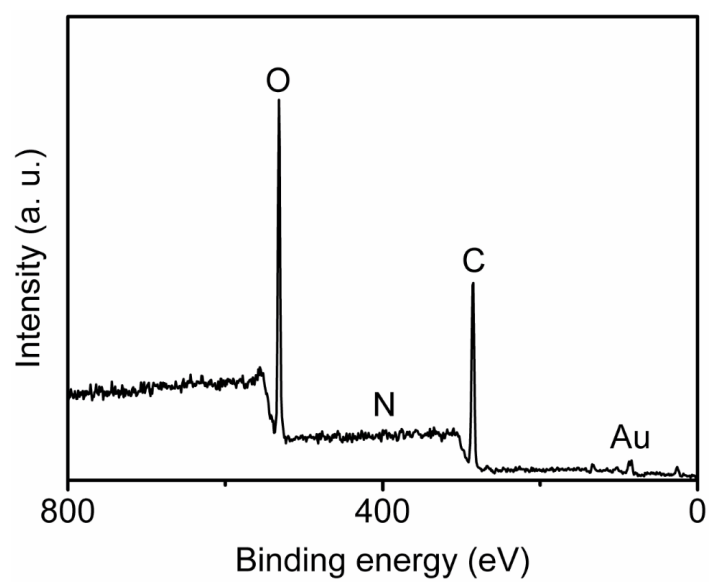


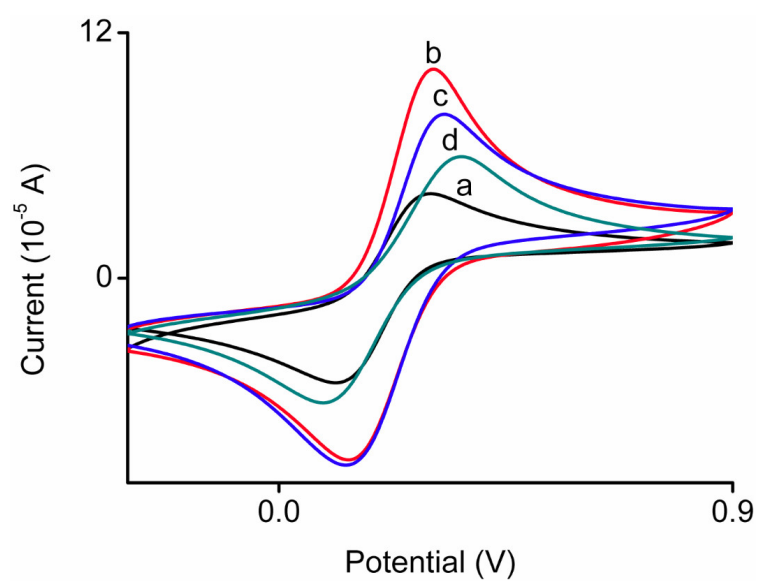
## **Electronic supplementary information**

A label-free electrochemical impedance genosensor coupled with recombinase polymerase amplification for genetically modified maize detection

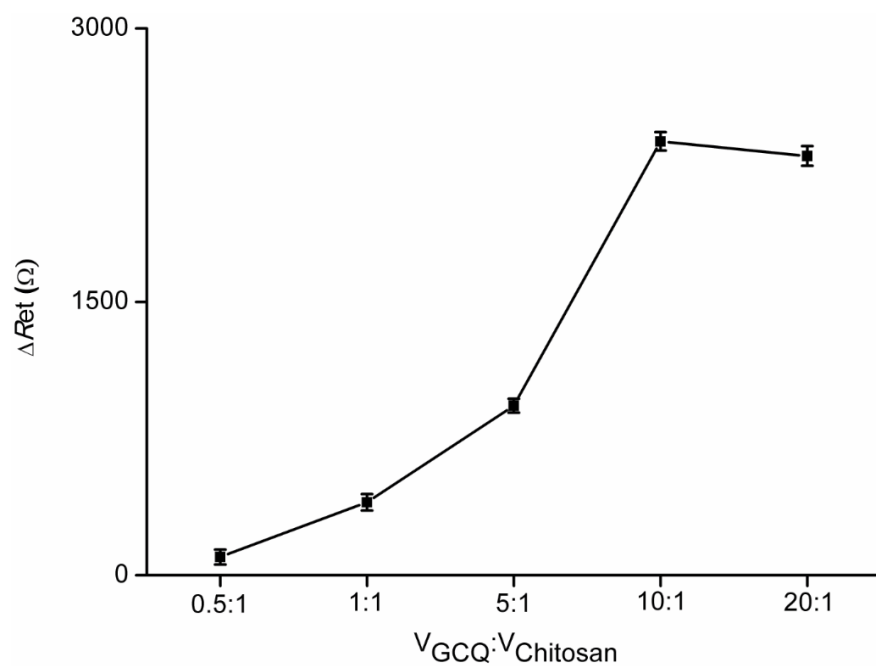
Dandan Cui, Shanshan Zhai, Yao Yang, Yuhua Wu, Jun Li, Xiaohong Yan, Ping Shen\*, Hongfei Gao\* and Gang Wu



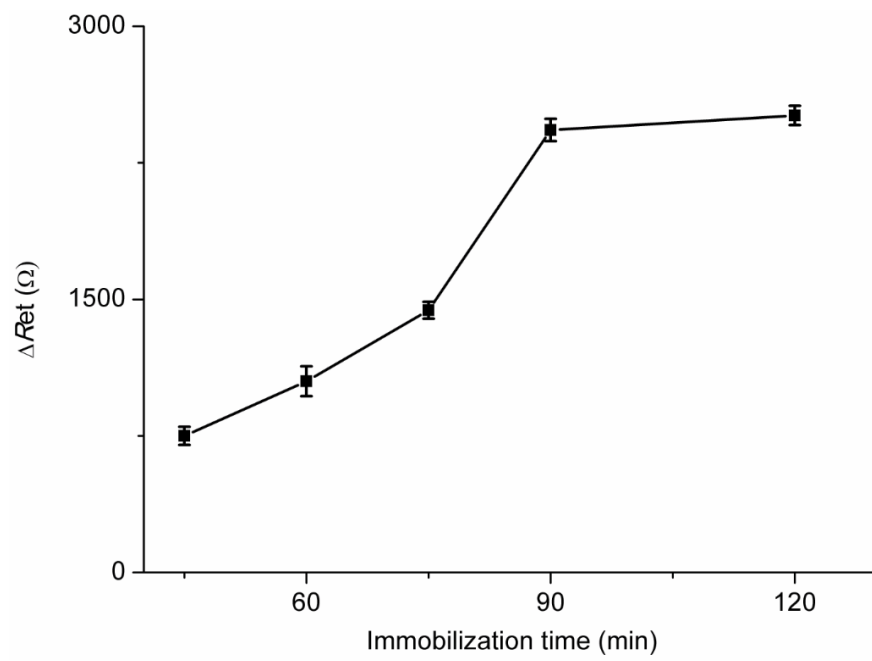
**Figure S1.** XPS of GCDs.



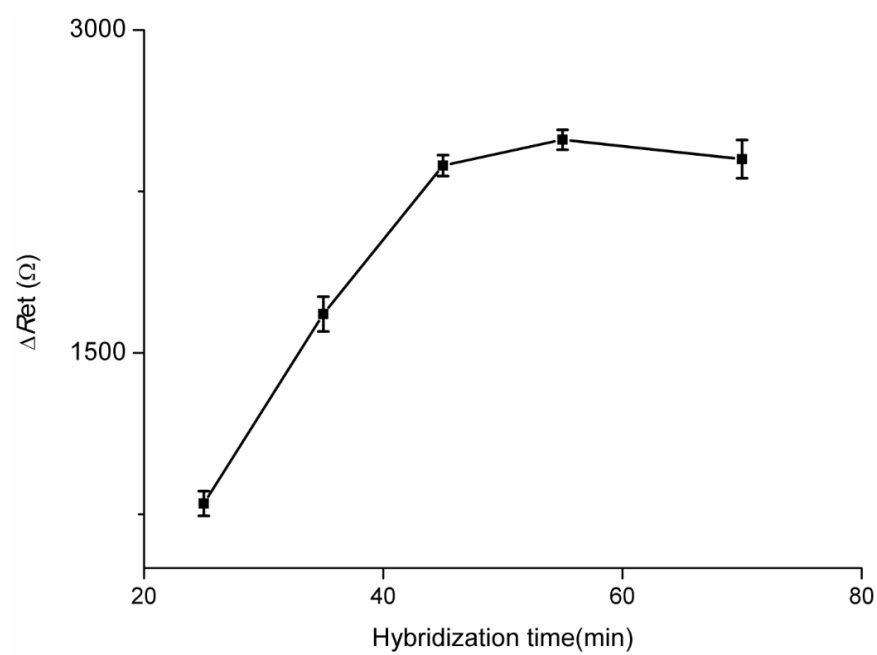
**Figure S2.** CV spectra of (a) bare electrode and chitosan-modified electrodes doped with (b) GCDs, (c) capture probe/GCDs and (d) target sequence/capture probe/GCDs.



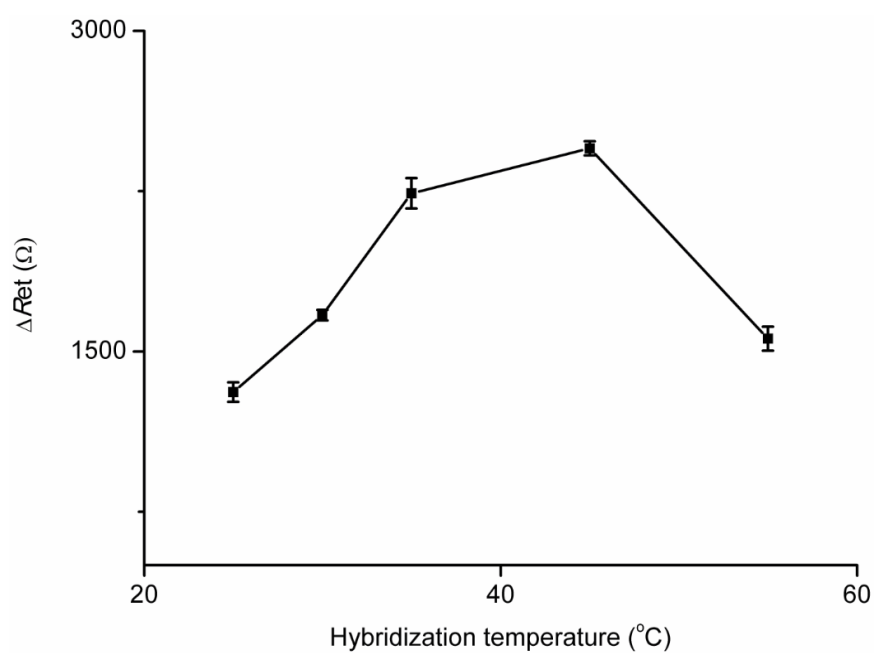
**Figure S3.** Effect of the volume ratio of chitosan at 1.0% and GCDs at 6.0 mg/mL on the  $\Delta Ret$  response for GM maize Ruifeng 12-5 at 10%. All other conditions were the optimal conditions,  $n = 3$ .



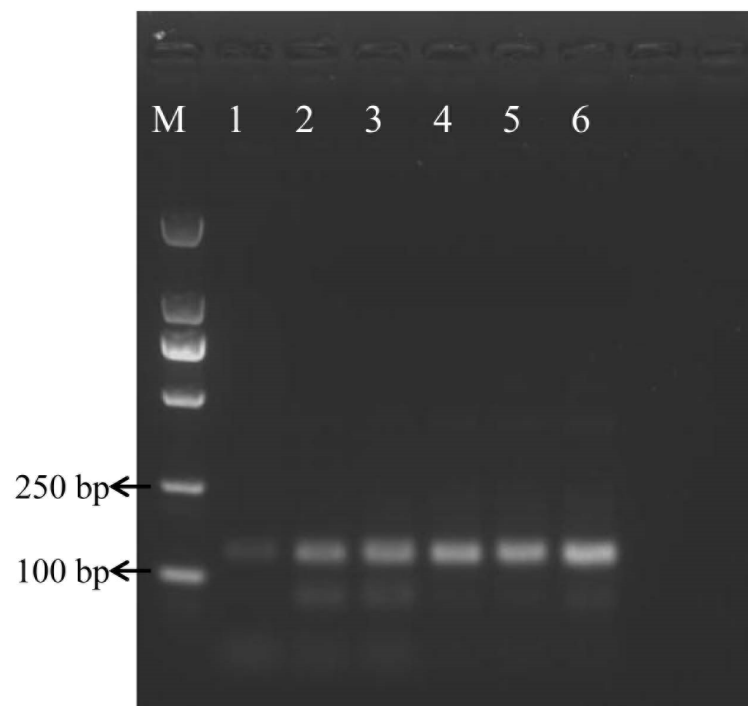
**Figure S4.** Effect of immobilization time of capture probe on the  $\Delta Ret$  response for GM maize Ruifeng 12-5 at 10%. All other conditions were the optimal conditions,  $n = 3$ .



**Figure S5.** Effect of hybridization time between capture probe and target sequence on the  $\Delta Ret$  response for GM maize Ruifeng 12-5 at 10%. All other conditions were the optimal conditions,  $n = 3$ .

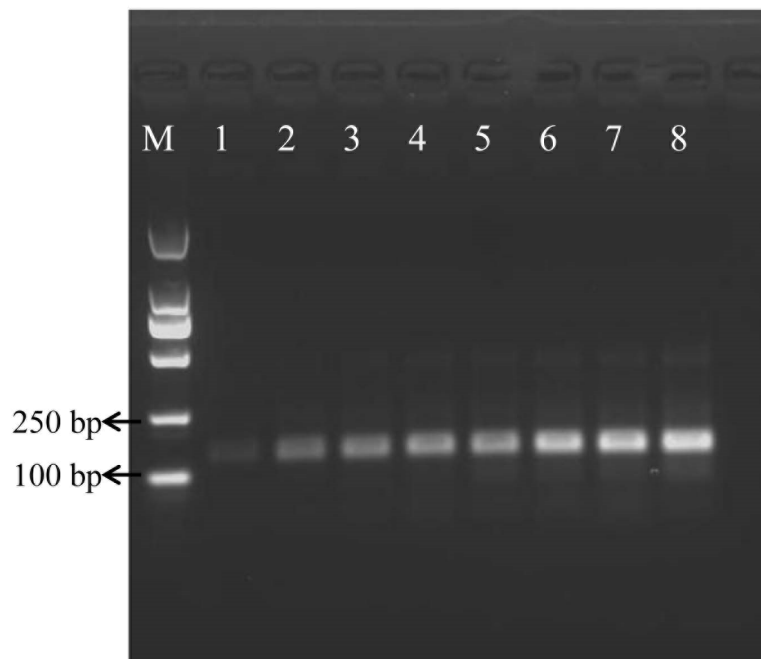


**Figure S6.** Effect of hybridization temperature between capture probe and target sequence on the  $\Delta Ret$  response for GM maize Ruifeng 12-5 at 10%. All other conditions were the optimal conditions,  $n = 3$ .

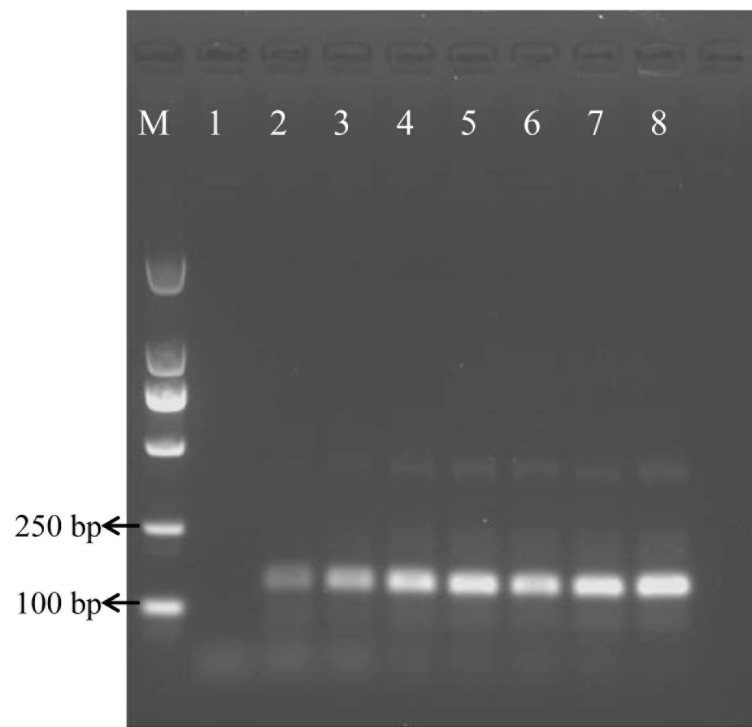


**Figure S7.** Agarose gel electrophoresis of RPA products at various reaction temperatures. Lane M: DL2000. Lane 1-6: 20 °C, 25 °C, 30 °C, 35 °C, 40 °C and 45 °C.



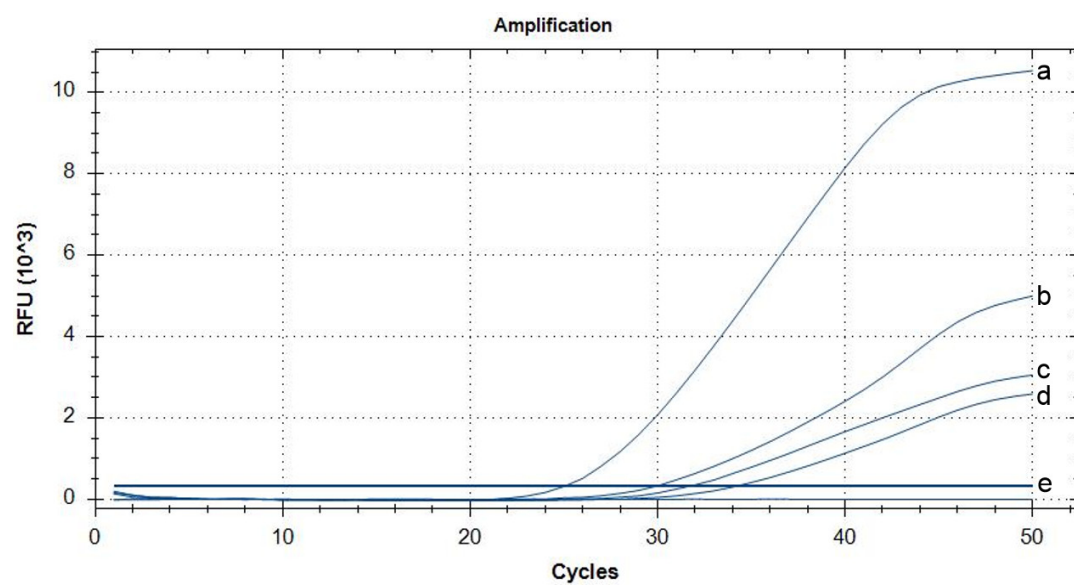


**Figure S8.** Agarose gel electrophoresis of RPA products from various primer concentrations. Lane M: DL2000. Lane 1-8: primer concentrations of 0.050, 0.10, 0.15, 0.20, 0.25, 0.30, 0.35 and 0.40  $\mu\text{M}$ , respectively.



**Figure S9.** Agarose gel electrophoresis of RPA products at various reaction time.

Lane M: DL2000. Lane 1-8: 5 min, 10 min, 15 min, 20 min, 25 min, 30 min, 35 min and 40 min.



**Figure S10.** The real-time PCR amplified curves from GM maize Ruifeng 12-5 at contents of 100%, 10%, 1.0%, 0.10% and non-GM maize, from a to e.