

Supporting Information

Impedimetric Immunoglobulin G Immunosensor based on Chemically Modified Graphenes

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Nyquist plots of CMG materials

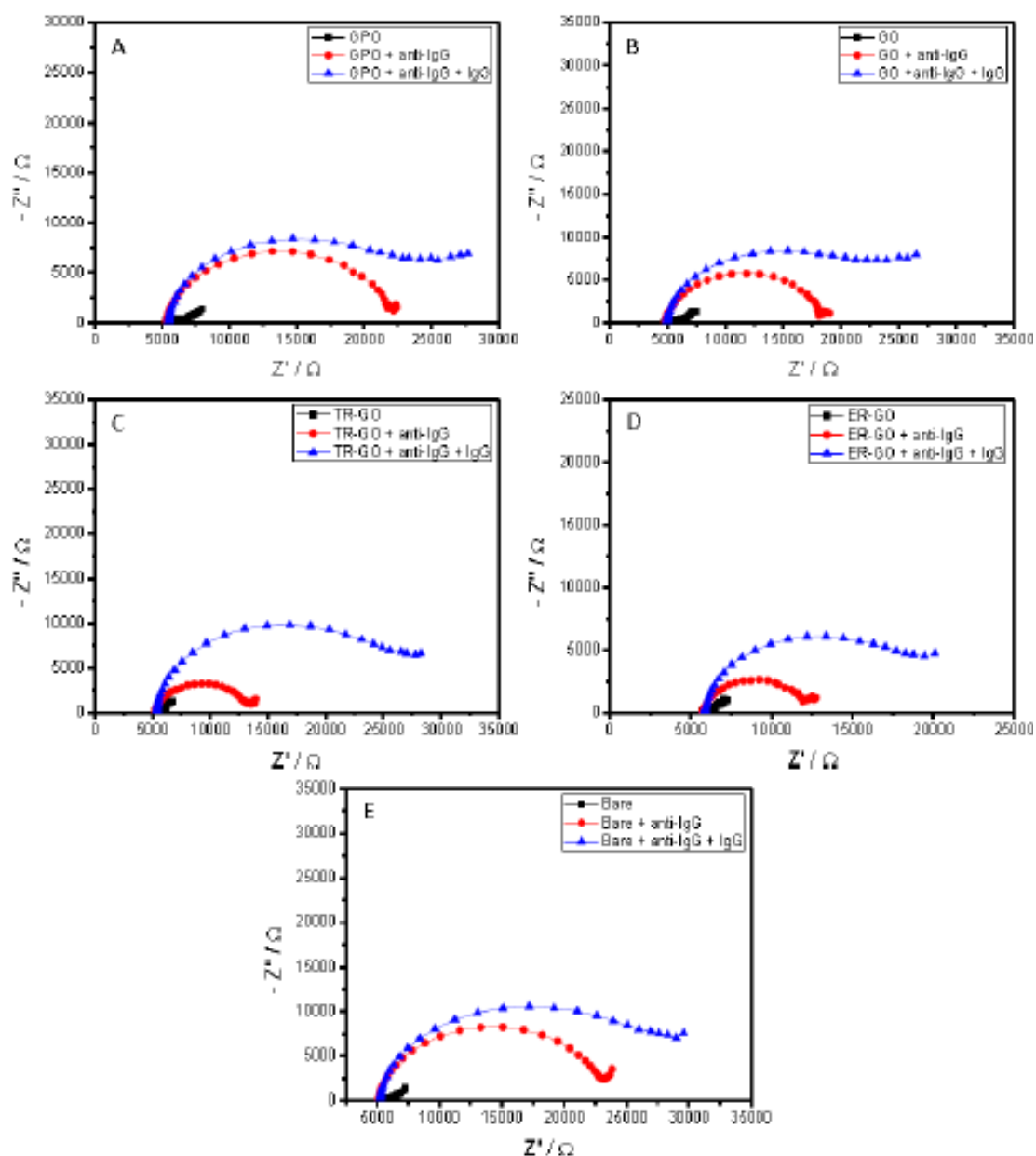


Fig. S1 Nyquist plots ($-Z''$ vs. Z') of the various CMG surfaces: (A) GPO (B) GO (C) TR-GO (D) ER-GO and (E) Bare (black), anti-IgG (red), IgG (blue). Concentration of anti-IgG used is 100 $\mu\text{g}/\text{ml}$, concentration of IgG target is 10 $\mu\text{g}/\text{ml}$. All measurements were performed with 10 mM $\text{K}_4[\text{Fe}(\text{CN})_6] / \text{K}_3[\text{Fe}(\text{CN})_6]$ in PBS buffer solution (pH = 7.4) at room temperature.

From Figure S1, it can be observed that for all five platforms, charge transfer resistance (R_{ct}) which corresponds to the diameter of the semi-circle, increases with immobilization of anti-IgG and further increases after incubation with IgG. In addition, it should also be noted that the surface which exhibited the greatest change in impedance signal after incubating with IgG

is TR-GO.

Nyquist plots of anti-IgG optimization

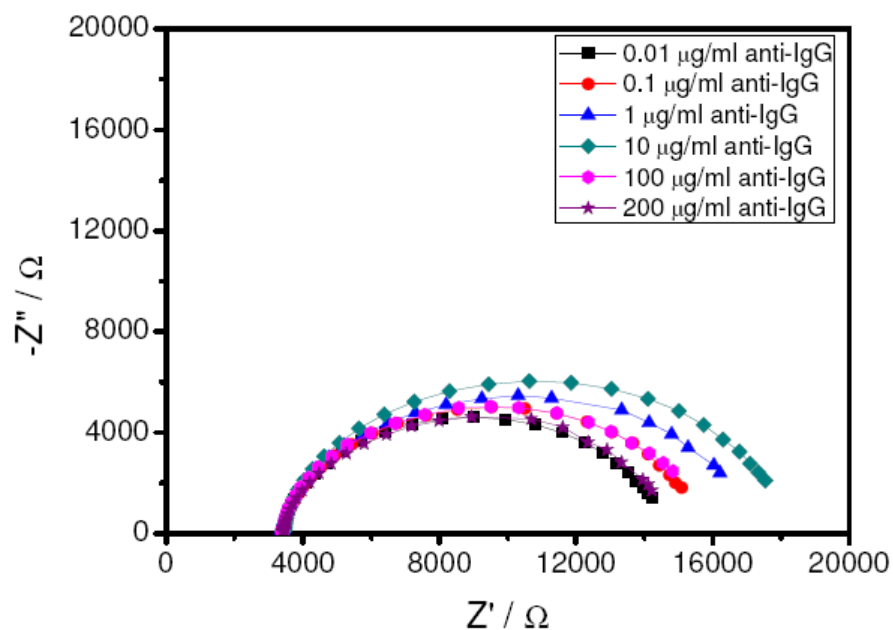


Fig. S2 Nyquist plots ($-Z''$ vs. Z') of the various concentrations of anti-IgG deposited on TR-GO modified DEP electrode surface. All measurements were performed with 10 mM $K_4[Fe(CN)_6] / K_3[Fe(CN)_6]$ in PBS buffer solution (pH = 7.4) at room temperature.

Nyquist plots of IgG calibration

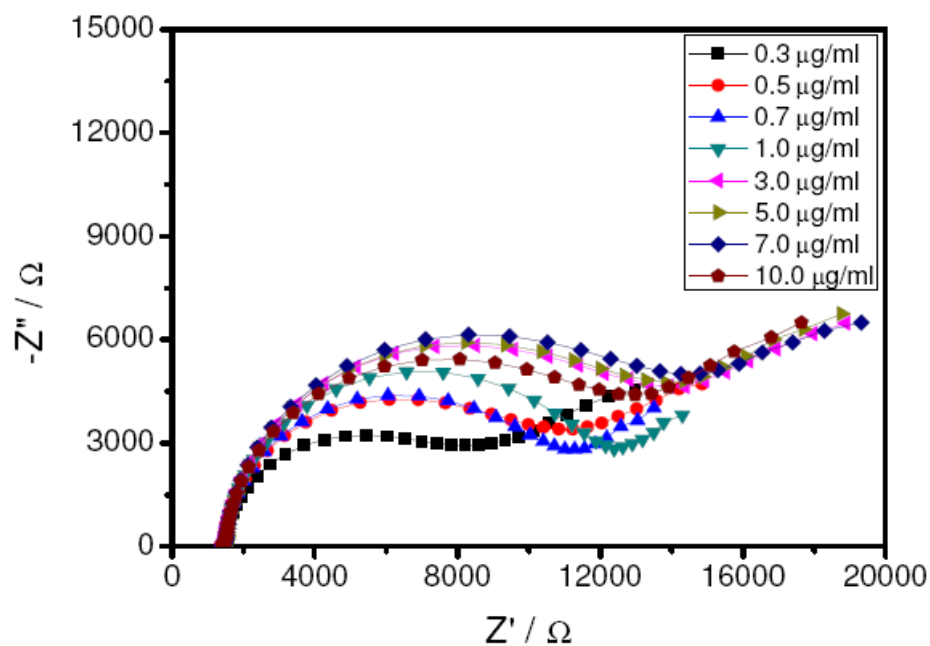


Fig. S3 Nyquist plots ($-Z''$ vs. Z') of the various concentrations of IgG incubated with. All measurements were performed with 10 mM $K_4[Fe(CN)_6] / K_3[Fe(CN)_6]$ in PBS buffer solution (pH = 7.4) at room temperature.

Nyquist plots of negative control study with BSA

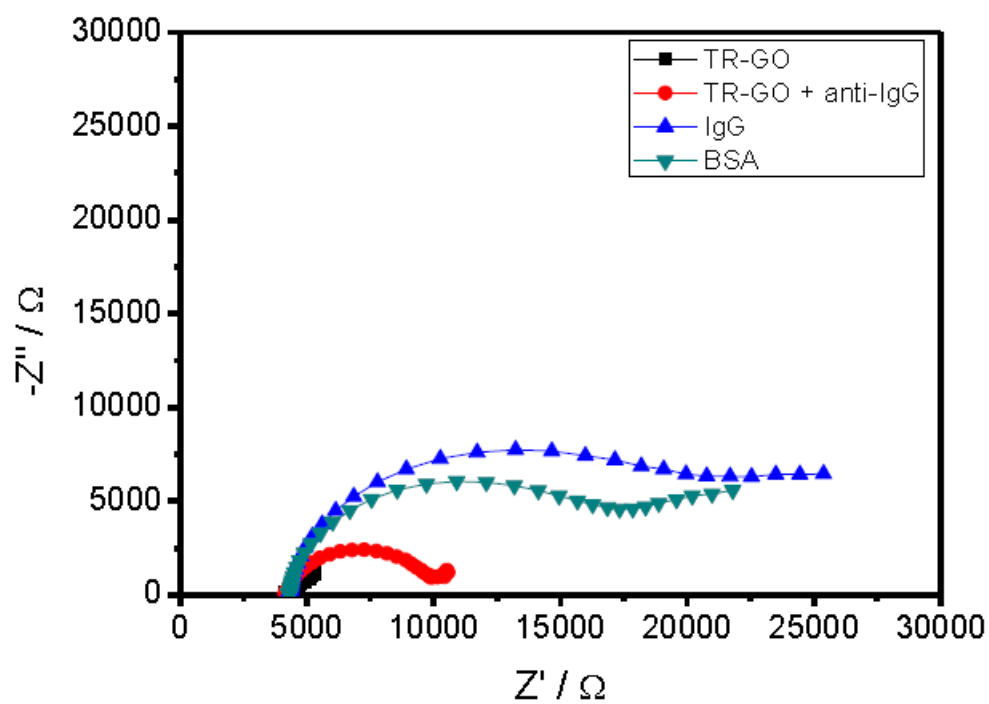


Fig. S4 Nyquist plots ($-Z''$ vs. Z') depicting the impedimetric response after the incubation with a different protein target. BSA was used as negative control. All measurements were performed with 10 mM $K_4[Fe(CN)_6] / K_3[Fe(CN)_6]$ in PBS buffer solution (pH = 7.4) at room temperature.

SEM study of CMGs electrode surface

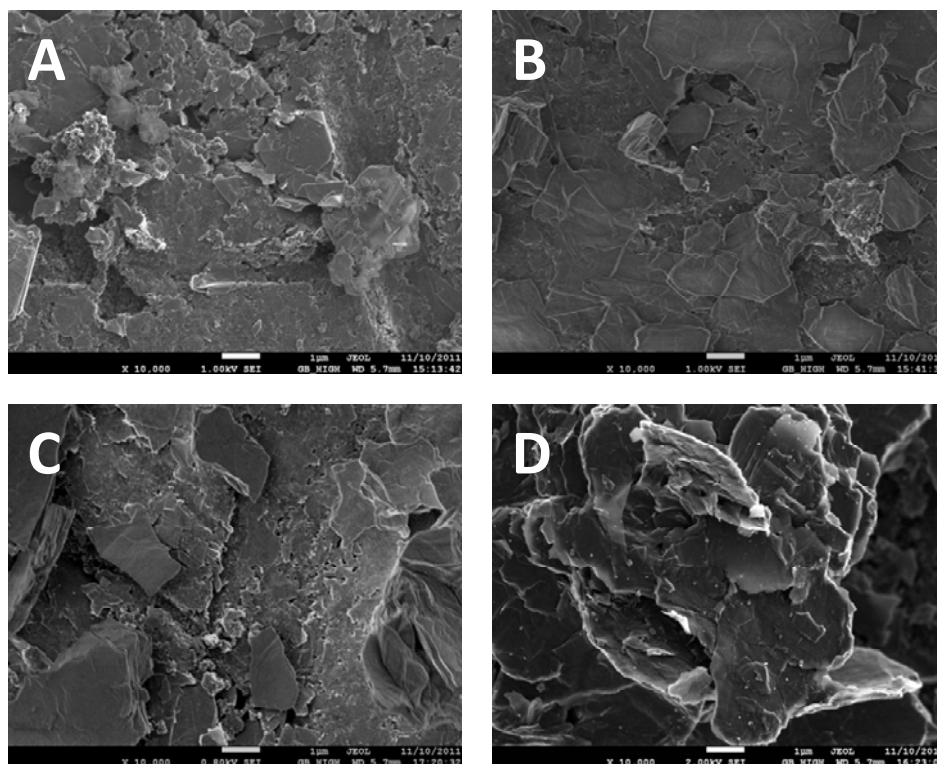


Figure S5. Scanning electron microscopy (SEM) images of: bare electrode (A); graphite oxide modified electrode (B); graphene oxide modified electrode (C); ER-GO modified electrode (D).

SEM study of TR-GO electrode surface during the immunosensing

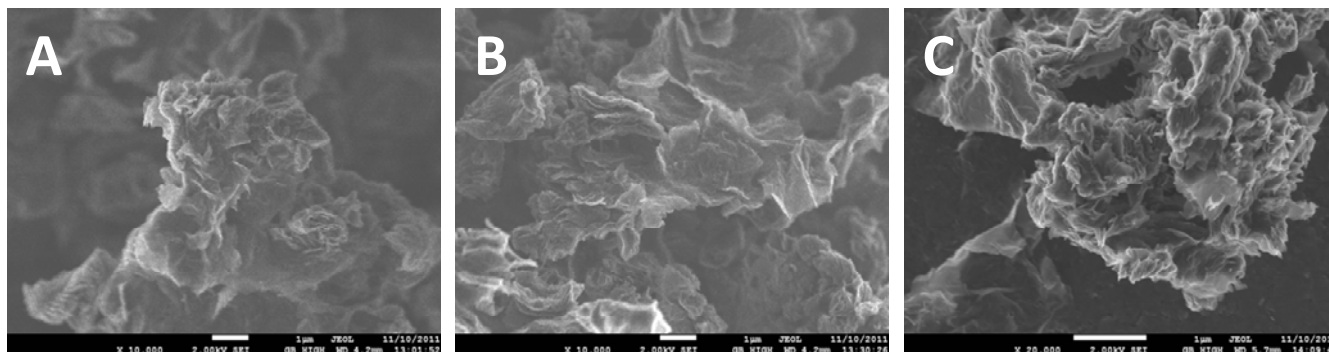


Figure S6. Scanning electron microscopy (SEM) images of: TR-GO modified electrode (A); TR-GO+anti-IgG modified electrode (B); TR-GO+anti-IgG+IgG modified electrode (C).