Supplementary Material

Improved immobilization of DNA to graphite surfaces, using amino acid modified clays

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1. Optimization of variables

In order to increase the amount of immobilized DNA on the PGE surface, some variables were optimized. For this purpose, the oxidation signal of guanine was followed. The optimum conditions for the immobilization time of Cloisite–Val on PGE and concentration of Cloisite–Val were studied using guanine signal. The results (Fig. S-1) showed that during the increasing of the immobilization time till 30 min, there was a dramatic increasing in the oxidation peak currents of guanine and then it was almost leveled off for longer immobilization time. So, this time was selected as an immobilization time of Cloisite–Val on PGE. Furthermore, the concentration of Cloisite–Val colloidal dispersion was changed between 1.0 % and 7.0 % (w/v) (Fig. S-2). It was observed that the oxidation peak current of guanine was increased with the Cloisite–Val concentration up to 5.0 % (w/v), and then it's leveled off. Therefore, 5.0 % (w/v) of the Cloisite–Val concentration was selected and used in all further experiments.

Fig. S-3 shows the effect of the DNA concentration on the guanine oxidation signals. As seen, an increasing in the electrochemical response was observed between 0.25 and 1.00 μg mL^{-1} of dsDNA concentration. For comparative purposes, 1.0 μg mL^{-1} dsDNA concentration was selected for further experiments. After this step, using 1.0 μg mL^{-1} ds-

DNA, the optimum accumulation time of ds-DNA studies were done between 2 and 15 min. The optimum accumulation time was obtained as 10 min (Fig. S-4).

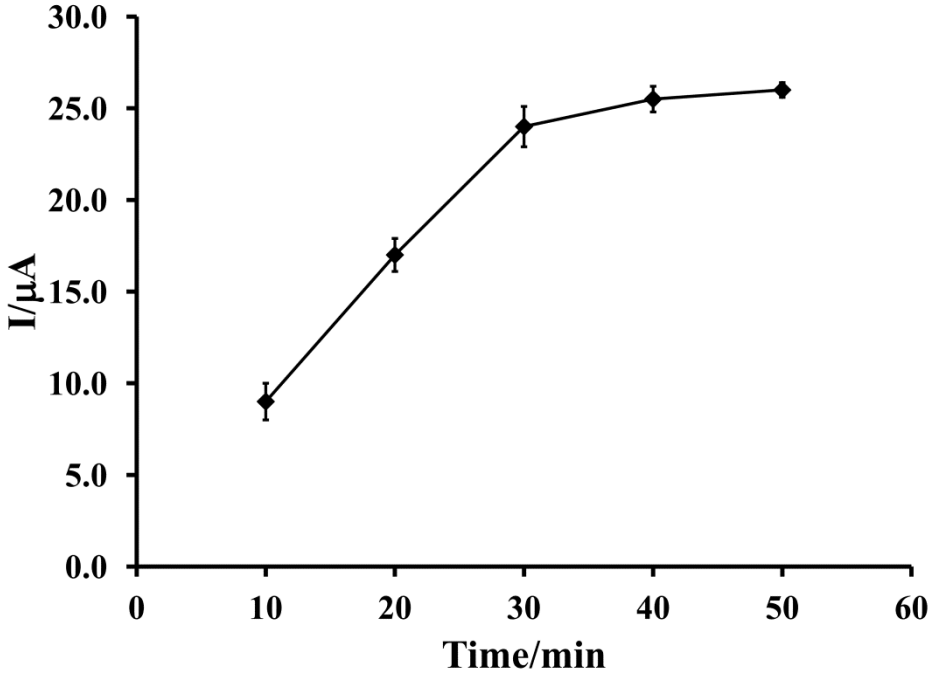

Figure S-1. The effect of immobilization time of Cloisite–Val on the oxidation signal of guanine for the optimization of dsDNA immobilization. (Concentration of Cloisite–Val; 4.0% (w/v), concentration of ds-DNA; 1.0 µg mL^{-1} and immobilization time of DNA; 10 min).

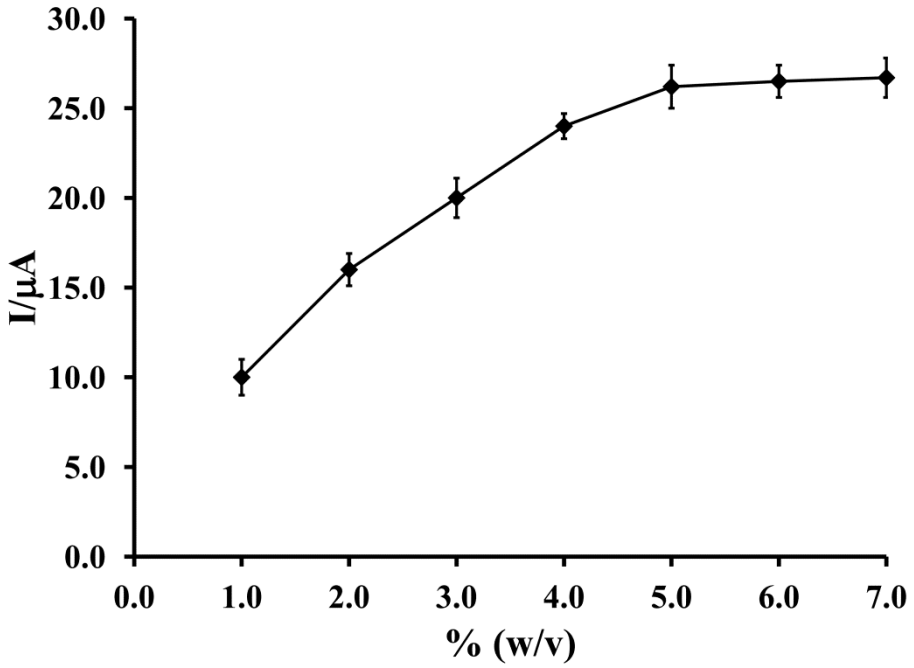

Figure S-2. The effect of Cloisite–Val concentration on the oxidation signal of guanine for the optimization of dsDNA immobilization. (immobilization time of Cloisite–Val; 30 min, concentration of ds-DNA; 1.0 μg mL^{-1} and immobilization time of DNA; 10 min).

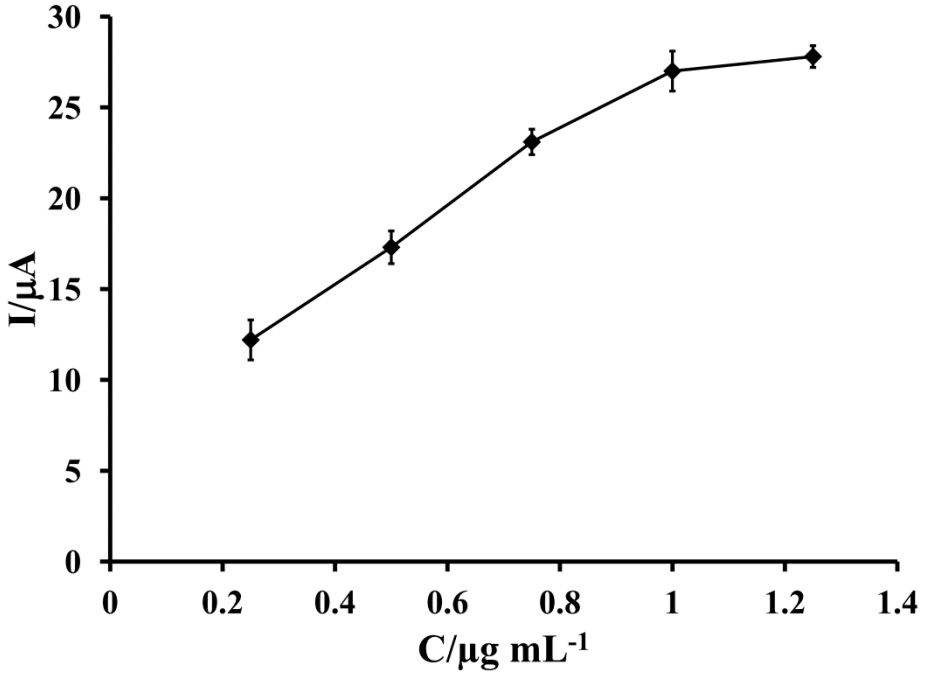

Figure S-3. The effect of DNA concentration on the oxidation signal of guanine for the optimization of dsDNA immobilization. (Immobilization time of Cloisite–Val; 30 min, Concentration of Cloisite–Val; 5.0% (w/v) and immobilization time of DNA; 10 min).

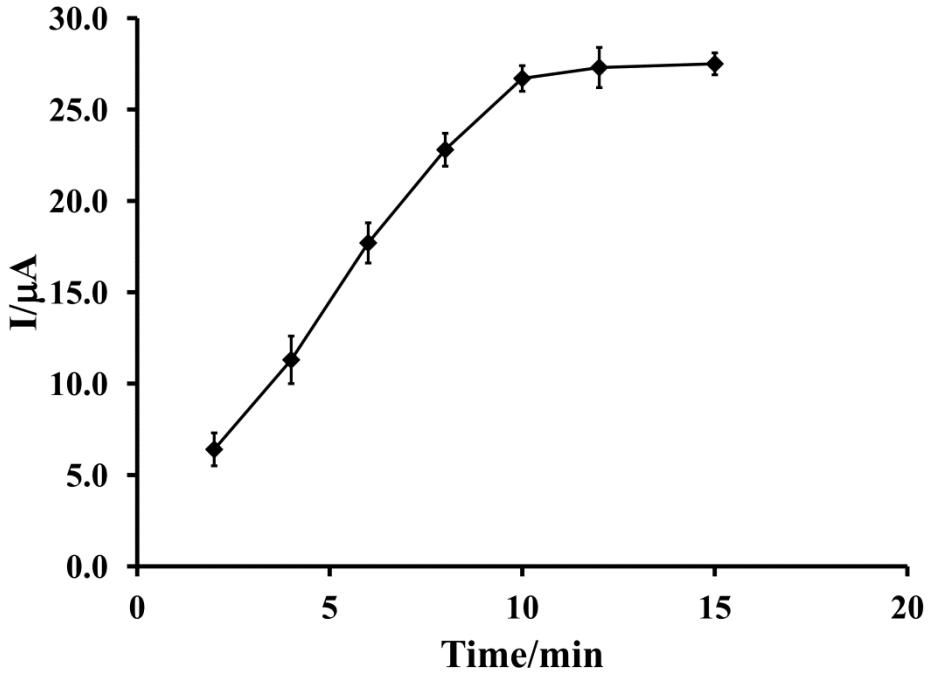

Figure S-4. The effect of immobilization time of DNA on the oxidation signal of guanine for the optimization of dsDNA immobilization. (Immobilization time of Cloisite–Val; 30 min, Concentration of Cloisite–Val; 5.0% (w/v) and concentration of ds-DNA; 1.0 μg mL^{-1}).