

**A novel electrochemical sensor for determination of uric acid in the presence of ascorbic acid and dopamine based on a carbon paste electrode modified with electrochemically reduced para-nitro benzoic acid/graphene oxide nanocomposite**

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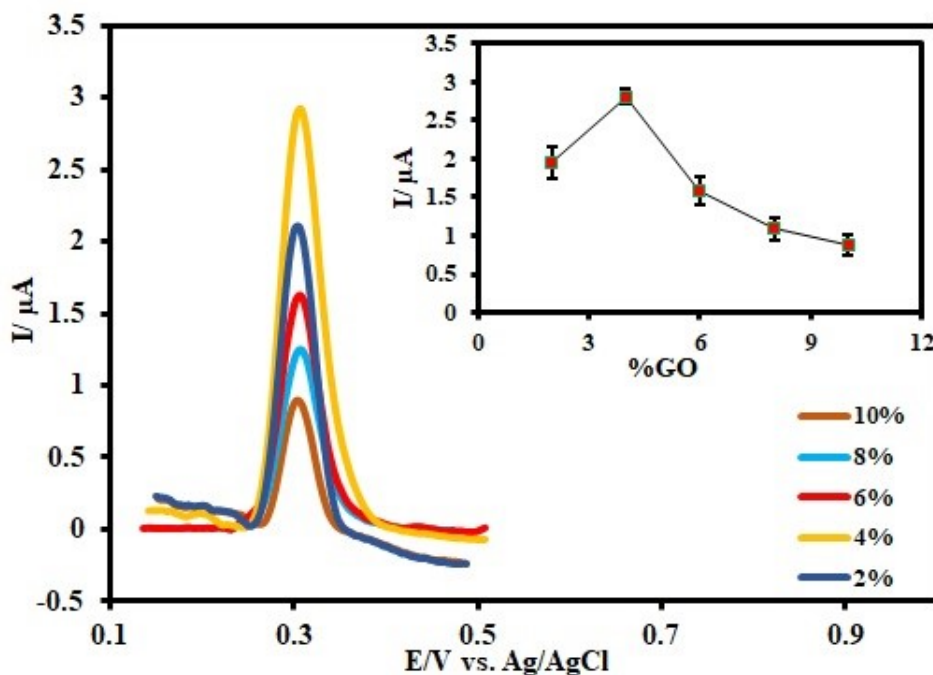
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The purpose of this study was to examine para nitro benzoic acid functionalize graphene oxide to enhance the electrocatalytic oxidation of uric acid. First, we studied the electrochemical behavior of the electrode modified with graphene oxide and para-nitro benzoic acid.

### Optimization of experimental parameters

In order to achieve better ERp-NBA/GO/CPE electrocatalytic performance for high-sensitivity determination of UA, the following experimental conditions were optimized, including: %GO and concentration of p-NBA.

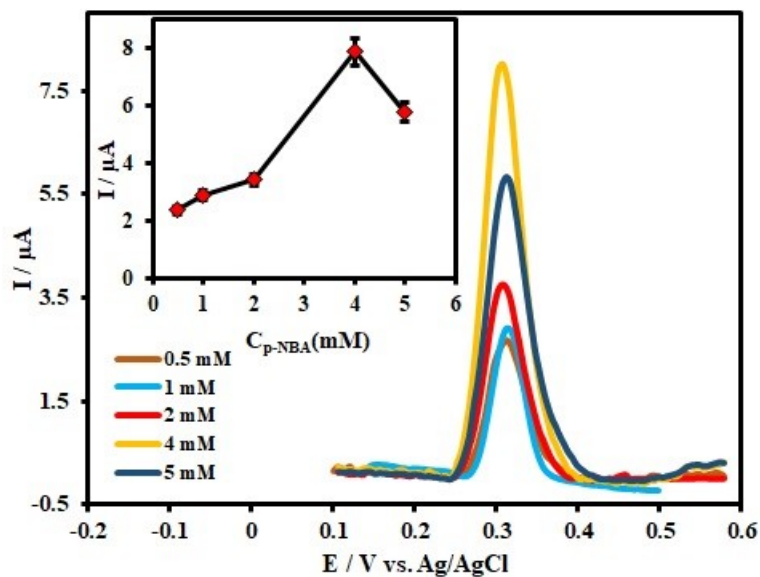
In order to determine the optimum percentage of GO, in table S1 amounts of 2%, 4%, 6%, 8%, and 10% GO were mixed with carbon paste by mortar for 15 minutes. According to Figure S1, differential pulse voltammogram (DPV) responses were obtained at different percentages of GO in a solution containing 50  $\mu\text{M}$  of uric acid. As can be seen, the maximum current for oxidation of UA was observed at 4%GO.



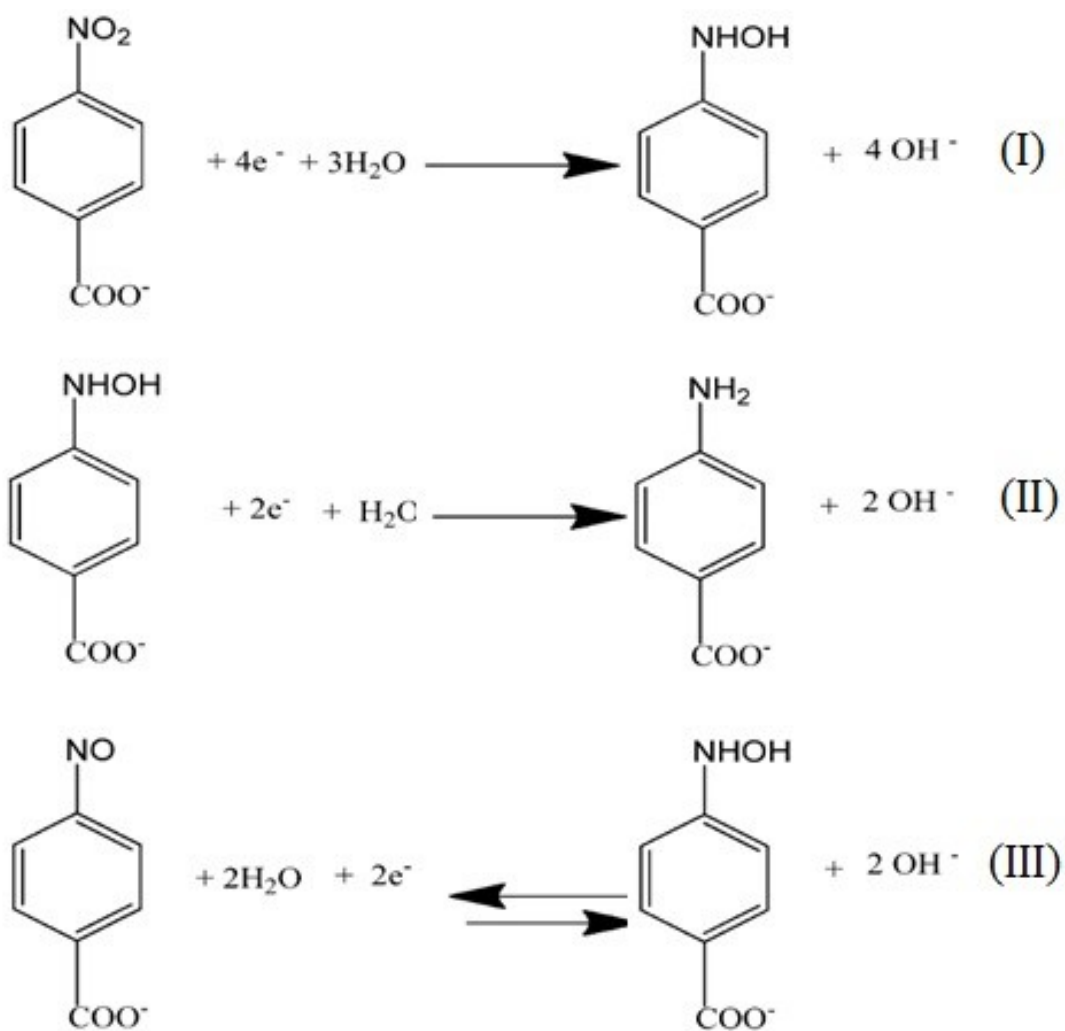
**Figure S1.** DPV of GO/CPE (%) in 0.1 M PBS (pH 7) containing 50  $\mu$ M of uric acid (A). Inset: pulse width 0.025 s, pulse height 0.05 V and scan rate 10 mV s<sup>-1</sup>. Effect of GO% on the peak current (B) (n=3).

One of the factors that affect the oxidation current uric acid is the monomer concentration of para nitro benzoic acid during the electrodepositing process. In Figure S2, a series of different concentrations of para nitro benzoic acid such as 0.0005M (a), 0.001 M (b), 0.002 M (c), and 0.004 M (d), 0.005M (f) were used for the modification of the electrode surface. Higher concentrations of the monomer from 2mM to 4mM cause oxidation current increase and oxidation potential leading to more negative that because of the coating of para nitro benzoic acid molecules on the surface of the graphene oxide-carbon paste electrode.

When the concentration of para nitro benzoic acid is increased to 5mM then the current of uric acid decreases, which due to the chemical coupling of nitroso compound with hydroxylamine was produced to azoxy compound during cycling. As a result, the surface coverage of para nitro benzoic acid molecules decreases. In Figure S2 due to the current, the concentration 4mM was selected as the optimization of concentration.



**Figure S2.** DPV were carried out in solution containing 50 μM of Uric acid in 0.1 M PBS (pH 7.0) to optimize the following experimental conditions: (A) Effect of concentration of para nitro benzoic acid during modification of electrode. (B) Peak concentration versus current related to the synthesis of para nitro benzoic acid (n=3).



**Scheme S1.** The main pathway of electrochemical reduction of para-nitrobenzoic acid.