ARTICLE

Simultaneous determination of ascorbic acid, uric acid and dopamine using silver nanoparticles and copper monoamino-phthalocyanine functionalised acrylate polymer

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Supporting Information

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1. Electrochemical characterisation of modified electrodes

Cyclic voltammetry was used to examine uric and ascorbic acid signals (1 µM in 0.1 M PBS) at bare, Ag NPs and Cu-MAPA modified glassy carbon electrodes (SI Figures 1 and 2).

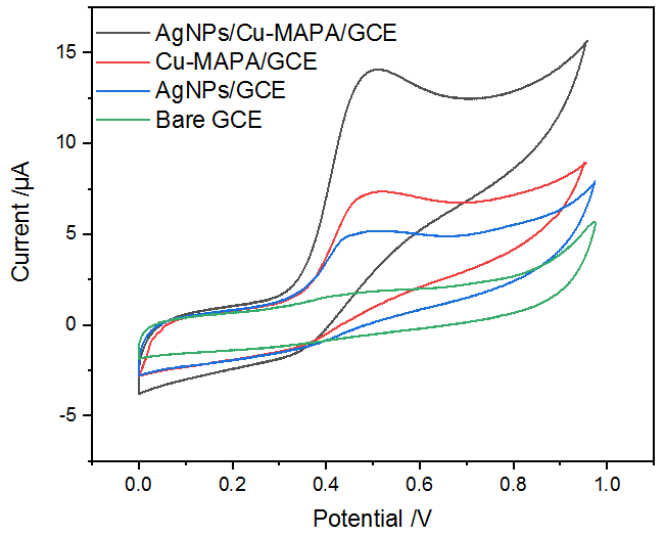

Fig 1. CVs of 1 µM uric acid prepared in 0.1 M PB (pH 7.4) at bare and modified electrodes GCE, GCE/AgNP, GCE/Cu-MAPA and GCE/Cu-MAPA/AgNP (100 mV s^{-1}).

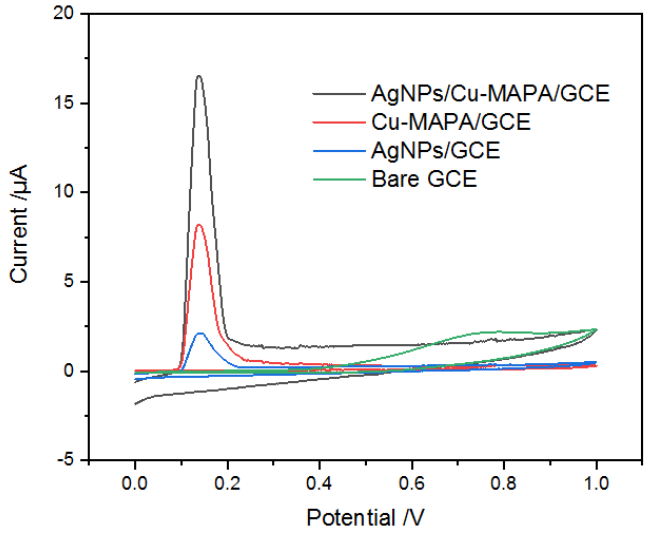

Fig 2. CVs of 1 µM ascorbic acid prepared in 0.1 M PB (pH 7.4) at bare and modified electrodes GCE, GCE/AgNP, GCE/Cu-MAPA and GCE/Cu-MAPA/AgNP (100 mV s^{-1}).

2. pH and scan rate effect

The peak current of dopamine increased with decreasing pH which was constant from pH 3-6. As pH 7 is considered as physiological pH, it was selected going forward as the working pH for all measurements.

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† Supplementary information available should be included here]. See DOI:

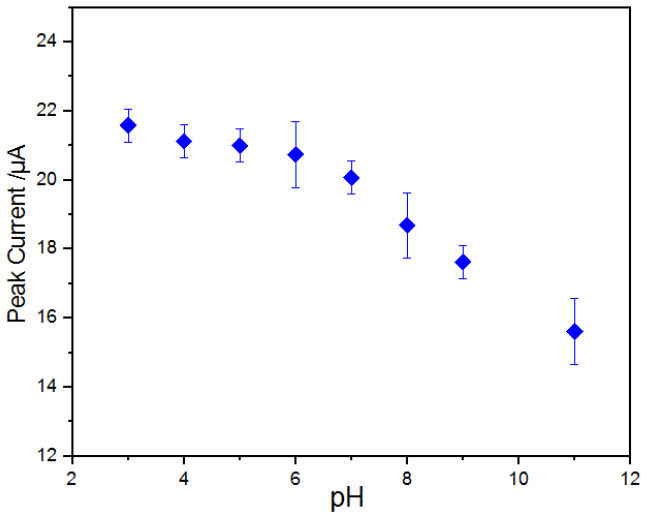

Fig 3. Response to 1 µM dopamine in different pH solutions (pH 3 to 11,) at a scan rate of 100 mV s^{-1}.

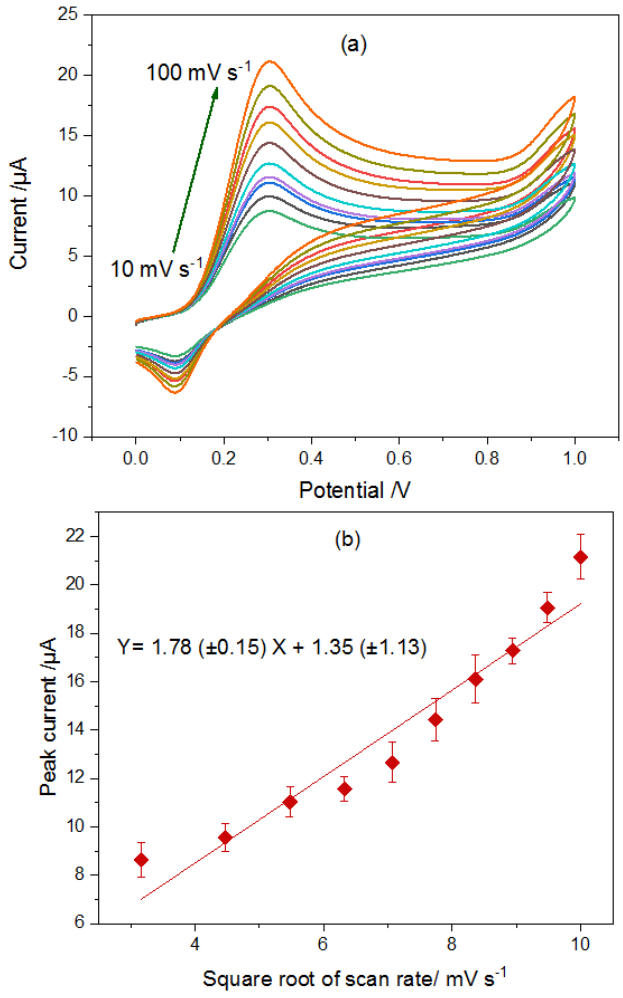

Fig 4. a) Cyclic voltammetry response of 1 µM dopamine at GCE/Cu-MAPA/AgNP at different scan rates from 10 to 100 mV s^{-1}. b) Square root of scan rate vs. peak current.

The anodic peak current of dopamine increased upon increasing scan rates from 10 to 100 mV s^{-1} and the peak currents had a dependence on the square root of scan rates from 10 to 100 mV s^{-1} with correlation coefficient of 0.9496. This indicated that a predominately diffusion controlled current was evident with the possibility of some adsorptive effects due to non-ideal linearity.

3. Reflectance microscopy surface images

Reflectance microscopy was used to visualise the surfaces of AgNP, Cu-MAPA and Cu-MAPA on AgNP which were dropcast on silicon surfaces and visualised in bright field (Figure 4). The Ag NP ranged from large aggregates (20-50 µm) to smaller <1 µm particles with larger aggregates formed in the presence of Cu MAPA.

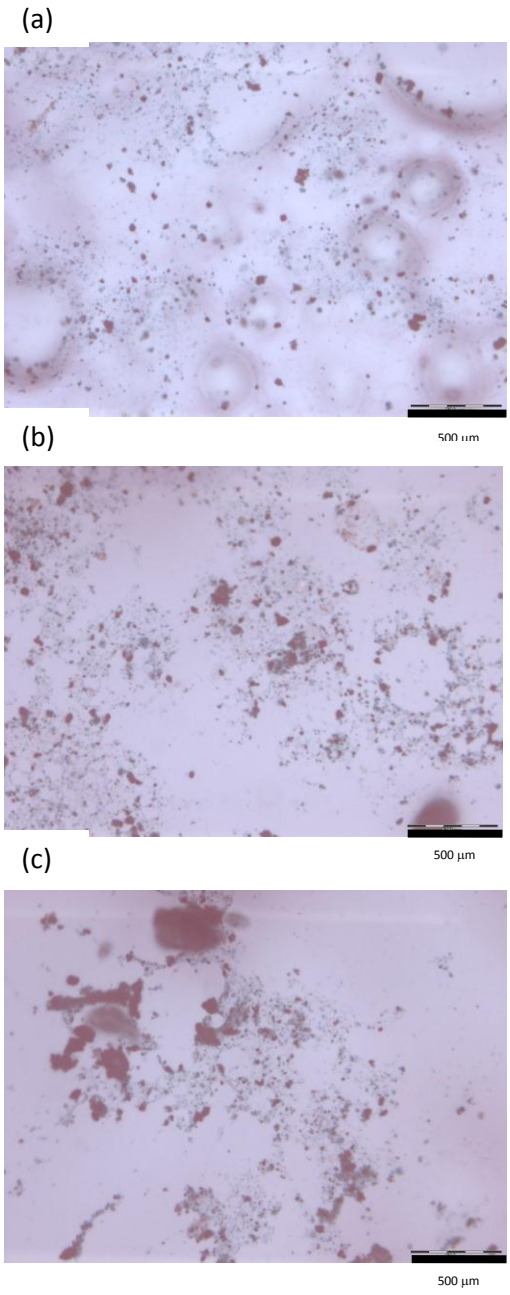

Fig. 5 Reflectance microscopy images on silicon substrates x 20 bright field
(a))Ag NPs (b) Cu-MAPA (c) Cu-MAPA on AgNPs