

Electrodeposition of poly(3,4-ethylenedioxythiophene)/reduced graphene oxide/manganese dioxide for simultaneous detection of uric acid, dopamine and ascorbic acid

ABSTRACT

A simple and sensitive sensor of poly(3,4-ethylenedioxythiophene)/reduced graphene oxide/manganese dioxide modified glassy carbon electrode (PrGO/MnO₂) was fabricated via cyclic voltammetry (CV) for simultaneous detection of uric acid (UA), dopamine (DA) and ascorbic acid (AA). The PrGO/MnO₂ composite film possessed excellent electrocatalytic rate and high selectivity towards the oxidation of UA, DA and AA in 0.1 M PBS (pH 6.0). The peak potential separation (ΔE_p) of AA-DA, AA-UA and DA-UA were 166, 312 and 146 mV, respectively. The detection limits of 1.00, 0.02 and 0.05 μM with a linear response of 1–800, 0.03–45 and 0.3–80 μM were obtained for AA, DA and UA, respectively. This sensor also showed an excellent stability (reproducibility and repeatability).

Keywords: Reduced graphene oxide; Manganese dioxide; PEDOT; Simultaneous detection; Uric acid; Dopamine and ascorbic acid