

Electrochemical determination of 3-nitrophenol with a reduced graphene oxide modified screen printed carbon electrode

ABSTRACT

An electrochemical sensor based on electrochemically reduced graphene oxide (ERGO) functionalized cetyltrimethylammonium bromide (CTAB) deposited on screen printed carbon electrode (SPCE) was developed for the detection of 3-nitrophenol. The ERGO/CTAB was prepared via drop casting technique on the screen printed carbon electrode (SPCE). The drop casted composite was then subjected to cyclic voltammetry technique to produce ERGO/CTAB. The modified electrode exhibits high electrocatalytic activity and good selectivity towards the reduction of 3-nitrophenol due to its excellent electrical conductivity, strong adsorptive ability and large effective surface area of ERGO functionalized CTAB. The enhancement factor of the ERGO/CTAB modified SPCE towards 3-nitrophenol was calculated to be 5.16 times higher compared to bare SPCE. Under optimum experimental conditions, the linearity of the sensor towards 3-nitrophenol concentration was in the range of 0.5 μM to 100 μM with the detection limit of 0.04 μM . Furthermore, the ERGO/CTAB sensor showed good reproducibility and also demonstrated efficiency in the detection of 3-nitrophenol in water samples.

Keyword: Electrochemically reduced; Environmental; Graphene oxide; Nitrophenol