

Voltammetry detection of ascorbic acid at glassy carbon electrode modified by single-walled carbon nanotube/zinc oxide.

ABSTRACT

A simple procedure was developed to prepare a glassy carbon electrode (GCE) modified with single-walled carbon nanotube/zinc oxide (SWCNT/ZnO). The carbon nanotube/zinc oxide composites were immobilized on the GCE by mechanical attachment. The electrode surface was gently rubbed on a filter paper supporting the SWCNT/ZnO composites. Cyclic voltammetry study of the modified electrode indicated that the oxidation potential shifted towards a lower potential by approximately 240 mV and the peak current was enhanced by 2.0 fold in comparison to the bare GCE. The resulting modified electrode also indicated the absence of a well-defined redox couple implying that the reaction is irreversible. The electrochemical behaviour was further described by characterization studies of scan rate, concentration of ascorbic acid, pH and temperature. The stability of the modified electrode was evaluated by potential cycling study. Such attractive results from the SWCNT/ZnO-modified electrodes suggest a promising ascorbic acid sensor.

Keyword: Ascorbic acid; Cyclic voltammetry; Glassy carbon; Single-walled carbon nanotubes; Zinc oxide.