

Electrocatalytic oxidation of ascorbic acid mediated by lithium doped microparticles Bi₂O₃/MWCNT modified glassy carbon electrode

ABSTRACT

Use of a lithium doped Bismuth oxide and MWCNT modified glassy carbon electrode (Bi₂O₃/Li⁺/CNT/GC) enhance the oxidation current of ascorbic acid during cyclic voltammetry compared to bare GC and (Bi₂O₃ /Li⁺/ CNT) modified electrode. Peak potential was observed to shift slightly to less positive value by about 220 mV and current was significantly enhanced by about two folds. The sensitivity under conditions of cyclic voltammetry is significantly dependent on pH, temperature, electrolyte and scan rate. The result of scanning electron micrograph shows that the size increased slightly by < 1 μm after electrolysis using Bi₂O₃ /Li⁺/ CNT modified electrode. The detection limit of this modified electrode was found to be 50 nM. The oxidation current of ascorbic acid decreased slightly after the first cycle and became stable with minor decreases after second cycle. It is therefore evident that the Bi₂O₃/CNT modified GC electrode possesses some degree of stability. Potential use of Bi₂O₃/CNT as a useful electrode material is therefore clearly evident.

Keyword: Electrocatalysis; Bi₂O₃/MWCNT composite; Modified GCE; Ascorbic acid; Cyclic voltammetry