

Electrochemical oxidation of ascorbic acid mediated by Bi₂O₃ microparticles modified glassy carbon electrode.

ABSTRACT

Bismuth oxide (Bi₂O₃) modified glassy carbon electrode (GCE) was fabricated by mechanical attachment. Electrochemical performance of microparticles of Bi₂O₃/GCE shows excellent electrooxidation of ascorbic acid (AA) in 0.1M KH₂PO₄ using cyclic voltammetry. The effect of Bi₂O₃/GCE is evident by the observation of high peak oxidation current of AA, showing an increase of 2 folds as compared to bare GCE. The detection limit of this modified electrode was found to be 8.1×10^{-6} M. Hydrodynamic method (RDE) was used to determine the diffusion coefficient and rate constant of AA with values of 5.4×10^{-6} cm²s⁻¹ and 2.7×10^{-3} cms⁻¹ for unmodified electrode, while the values of 6.2×10^{-6} cm²s⁻¹ and 2.3×10^{-3} cms⁻¹ for GCE modified with Bi₂O₃, respectively.

Keyword: Ascorbic acid; Bi₂O₃ microparticles; Current enhancement; Cyclic voltammetry; Modified GC electrode.