

Electrochemical Detection of Polycyclic Aromatic Hydrocarbons in Urban Air by Exfoliated Graphite Based Electrode

Authors : A. Sacko, H. Nyoni, T. A. M. Msagati, B. Ntsendwana

Abstract : Carbon based materials to target environmental pollutants have become increasingly recognized in science. Electrochemical methods using carbon based materials are notable methods for high sensitive detection of organic pollutants in air. It is therefore in this light that exfoliated graphite electrode was fabricated for electrochemical analysis of PAHs in urban atmospheric air. The electrochemical properties of the graphite electrode were studied using CV and EIS in the presence of acetate buffer supporting electrolyte with 2 Mm ferricyanide as a redox probe. The graphite electrode showed enhanced current response which confirms facile kinetics and enhanced sensitivity. However, the peak to peak (DE) separation increased as a function of scan rate. The EIS showed a high charger transfer resistance. The detection phenanthrene on the exfoliated graphite was studied in the presence of acetate buffer solution at PH 3.5 using DPV. The oxidation peak of phenanthrene was observed at 0.4 V. Under optimized conditions (supporting electrolyte, pH, deposition time, etc.). The detection limit observed was at 5×10^{-8} M. Thus the results demonstrate with further optimization and modification lower concentration detection can be achieved.

Keywords : electrochemical detection, exfoliated graphite, PAHs (polycyclic aromatic hydrocarbons), urban air

Conference Title : ICERST 2018 : International Conference on Environmental Remediation Systems and Technology

Conference Location : New York, United States

Conference Dates : June 03-04, 2018