Highly Sensitive Amperometric Sensor for Nitrobenzene Detection Using Functionalized Multiwalled-Carbon Nanotubes Modified Screen Printed Carbon Electrode

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We have developed a cost-effective screen printed carbon electrode (SPCE) modified with functionalized multiwalled carbon electrode (*f*-MWCNT) for the sensitive electrochemical determination of nitrobenzene (NB). First, *f*-MWCNT was prepared through acid treatment and characterized by scanning electron microscopy, Energy-dispersive X-ray spectroscopy and electrochemical impedance spectroscopy. Next, it was dispersed in nafion and the resulting solution was drop casted onto the screen printed carbon electrode (SPCE) in order to prepare modified electrode. The *f*-MWCNT/SPCE showed excellent electrocatalytic ability towards nitrobenzene. The fabricated electrode sensitively detects low concentrations of nitrobenzene and the detection limit is obtained as 45 nM. The linear range of the sensor is 50 nM to 1170 μ M and the sensitivity is 0.6685 μ A μ M cm⁻². Moreover, the electrode delivers satisfactory stability, repeatability and reproducibility. The electrode is successful in the determination of nitrobenzene in spiked human urine sample reveals its potential practical applicability.

Keywords: Nanotechnology, carbon nanomaterials, thin films, one dimensional material, environmental safety, toxic compounds,

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