

Fabrication of bottom-up multiwalled carbon nanotube electrode for sensitive electrochemical detection

ABSTRACT

Preliminary study of the growth of multiwalled carbon nanotube (MWCNT) was done using plasma enhanced chemical vapour deposition (PECVD) technique. Posttreatment of MWCNT using different kinds of plasma atmosphere including oxygen, hydrogen and nitrogen were applied to introduce defects on the surface of MWCNTs and nitrogen plasma gives the most significant arises on the peak current compared to the bare electrode with increment from ~ 0.33 mA to ~ 0.42 mA with increased of effective area from ~ 0.32 cm² to ~ 0.49 cm². The study was extended into fabrication of screen-printed electrode system using photolithography methods and the MWCNTs working electrodes were modified under nitrogen plasma to enhance the surface sensitivity.

Keyword: Bottom-up; Multiwalled carbon nanotube; Plasma-enhanced chemical vapour deposition; Plasma-treatment; Cyclic voltammetry