



DIAMOND

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ABSTRACT BOOK

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References:

- [1] 1. J. Buriak, *Chem. Rev.* 102(5) (2002) 1271-1308
- [2] R. Boukherroub, *Review in Current Opinion in Solid State & Materials Science*, 2006
- [3] M.C. Granger et al. *Anal. Chem.* 72 (2000) 3793–3804.
- [4] Y. Coffinier et al. *Langmuir* 21(4) (2005) 1489-1496.

Keywords: Hydrogen-terminated, chemical functionalization, site-specific ligation, peptide chips

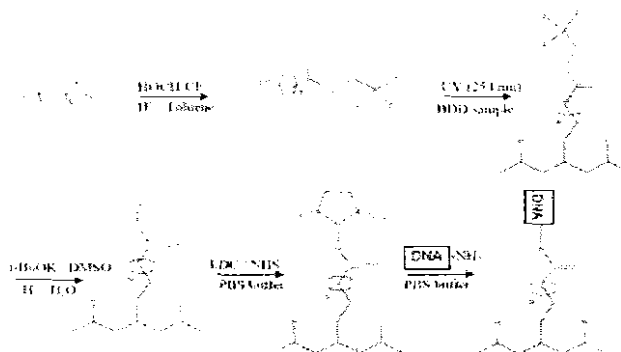
[9.5]

Direct impedimetric biosensing on highly stable UV photochemical functionalized diamond

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The photochemical functionalization of boron-doped diamond (BDD) with undecylenic acid and protected undecylenic acid (TFEU) have been investigated. It was observed that the unprotected UA imparts a higher density of carboxylic groups on diamond. Highly stable and well-defined micro-arrays of immobilized DNA probes on BDD surfaces could be fabricated by tethering 5' amino-modified DNA probes to the BDD surface. Biorecognition events can be sensed by electrochemical impedance spectroscopy (EIS). The electrochemical characteristics of BDD as well as its immobilized layers were directly documented by EIS in the absence of redox probe. The origins of the frequency dependence of impedance were analyzed and correlated to the different frequency ranges where either effects of the space charge layers in diamond, or resistive changes in surface monolayers, dominate the total impedimetric response in the circuits. The impedimetric biosensing was also carried out using a microfluidic cell for more sensitive detection and higher throughput.



Keywords: Surface, functionalisation, biosensors, surface modification

[9.6]

Hemocompatibility and anti-bacterial properties of silver doped diamond-like carbon thin films synthesized by pulsed filtered cathodic vacuum arc

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Recently studies have shown that diamond-like carbon (DLC) films are potential materials in biomedical devices. Doping of DLC is an attractive method to enhance the properties of DLC for biomedical applications. In this work, diamond-like carbon (DLC) films doped with silver (Ag) were deposited by means of pulsed filtered cathodic vacuum arc (FCVA). Silver was chosen as the dopant because of its anti-bacterial properties. The biocompatibility of Ag doped DLC films were estimated by using the platelets adhesion and anti-bacterial tests. The films were characterized by scanning electron microscopy (SEM), x-ray photoelectron spectroscopy (XPS), atomic force microscopy (AFM), Raman spectroscopy and contact angle tests. Good results of platelets adhesion test were obtained in samples with certain deposition parameters, and these samples exhibit better biocompatibility than the control sample made of low-temperature isotropic carbon (LTIC). Our results demonstrate that Ag-doped DLC has large potential as biomaterials due to the good blood compatibility and anti-bacterial behavior.

Keywords: Diamond-like carbon, Ag doping, hemocompatibility, anti-bacteria