



národní
úložiště
šedé
literatury

Self-Catalyzed Growth of Silicon Nanowires using Low Temperature Chemical Vapor Deposition

Dřínek, Vladislav
2014

Dostupný z <http://www.nusl.cz/ntk/nusl-180432>

Dílo je chráněno podle autorského zákona č. 121/2000 Sb.

Tento dokument byl stažen z Národního úložiště šedé literatury (NUŠL).

Datum stažení: 14.06.2024

Další dokumenty můžete najít prostřednictvím vyhledávacího rozhraní nusl.cz .

DŘÍNEK Vladislav**Institute of Physics AS CR, v.v.i., Prague, Czech Republic, EU****Self-catalysed Growth of Silicon Nanowires using Low Temperature Chemical Vapor Deposition****PA98**

Majority of deposition techniques for preparation of silicon nanowires (Si NWs) anticipate using of metal seed for the growth initialisation via vapor-liquid-solid (VLS) approach. However, those metals - especially most used Au - act as deep level traps for free charge carriers resulting in deteriorated properties of micro- and optoelectronic SiNW components. The solution bases on avoiding metal seeds and applying self-catalysed approach. Although very few works have been published dealing with this approach, the possible benefit has an important impact on SiNW technology. Therefore we deposited SiNWs onto molybdenum substrates using low pressure chemical vapor deposition (LPCVD). During the experiment the temperature was fixed at 500 °C a the pressure approximately at 45 Pa. As a result, SiNws were grown with length up to several microns and width from about 40 to 200 nm depending on experimental conditions. Several analytical techniques were used for characterisation of SiNW deposits: scanning electron microscopy (SEM), high resolution transmission electron microscopy (HRTEM), energy dispersive X-ray analysis (EDX), Raman spectroscopy and selected area electron diffraction (SAED).

Co-authors: **FAJGAR Radek, KLEMENTOVÁ Mariana**

Collaboration: **Institute of Chemical Process Fundamentals of the AS CR, v.v.i., Prague, Czech Republic, EU**

ABKHALIMOV Evgeny**A.N. Frumkin Institute of Physical Chemistry and Electrochemistry of RAS, Moscow, Russian Federation****Nature of the Surface of Detonation Nanodiamond and its some Functional Properties****PA99**

The main reason of not gained interest of researchers to the detonation-synthesized nanodiamond (DND) particles is a simplest carbon nanomaterial. The surface of its particles hasn't oxide phase and is multifunctional that allows to carry out the directed chemical modifying of its surface. Commercial DND has essential features which limit its application in nanobiotechnology. In this work, the directed chemical modifying of a surface of commercial DND produced by Sinta (Minsk, Republic of Belarus) is carried out. The DNDs with the amine-, chlorine-group, and partially graphitized surface were synthesized. Its physical and chemical properties, including dzetta-potential are investigated. In wide pH-range the DNDs with oxidized surface have exhibited high sedimentation stability in aqueous solutions. For the purpose to use the chemical-modified DMD in biotechnological or medical applications, the assessment of its ability to sorb viruses has been carried out. The HA titers of influenza viruses decreased in 8 till 500 times after contact with sorbents. The toxic properties of the chemical-modified DMD on cotton rats have been estimated. The Assessment of embryo toxicity, teratogenicity and mutagenicity has been carried out on Zebrafish (*Danio rerio*). ACKNOWLEDGEMENTS: This work was supported by a grant of MK-3937.2013.3; the Cooperative Agreement N 1U51P000527-01, CDC&P, USA; RFBR 14-03-31817.

Co-authors: **ISAKOVA Alexandra, IVANOVA Marina, IVANOVA Valeriya, GALUSHKO Tatyana, AFONINA Ludmila, SPITSYN Boris**

Collaboration: **D.I. Ivanovsky Institute of Virology of Ministry of Health of the Russian Federation, Moscow, Russian Federation**

ISAKOVA Aleksandra**A.N. Frumkin Institute of Physical Chemistry and Electrochemistry of RAS, Moscow, Russian Federation****Self-assembled Nanostructures based on Yttrium(III) Tetra-15-Crown-5-Phthalocyaninate****PA100**

Optical and electrochemical properties of materials, based on phthalocyanines, are strongly influenced by their supramolecular organization in solid phase (crystals, polymeric composites, thin films). However, the understanding of the behavior of phthalocyanine complexes in solution and their tendency to aggregation due to weak intermolecular interactions allows to predict the assembling of molecules in the solid state. Herein, we performed systematic investigation of self-assembly of yttrium tetra-15-crown-5-phthalocyaninate-acetate (1) in tetrachloroethane (TCE) solution. Studies were performed by means of transmission electron and atom force microscopy (TEM and AFM), as well as UV-Vis spectroscopy and dynamic light scattering (DLS). DLS studies revealed that successive heating/cooling cycles, applied to solution of (1) in TCE resulted in formation of nanoparticles. Their formation was observed even after the first