Title (en)

METHODS AND APPARATUS FOR THE FABRICATION AND USE OF GRAPHENE PETAL NANOSHEET STRUCTURES

Title (de)

VERFAHREN UND VORRICHTUNG ZUR HERSTELLUNG UND VERWENDUNG VON BLÜTENBLATTFÖRMIGEN GRAPHEN-NANOFOLIENSTRUKTUREN

Title (fr)

PROCÉDÉS ET APPAREIL POUR LA FABRICATION ET L'UTILISATION DE STRUCTURES EN NANOFEUILLE DE PÉTALE DE GRAPHÈNE

Publication

EP 2744751 A4 20150805 (EN)

Application

EP 12845269 A 20120815

Priority

- US 201161523646 P 20110815
- US 2012051008 W 20120815

Abstract (en)

[origin: WO2013066474A2] Nanostructured electrochemical biosensors comprised of carbon-based nanomaterials offer a unique high-performance platform for electrochemically sensing numerous biomolecular agents due to their unique mechanical, electrical, and chemical properties. Various embodiments described herein present scalable nanostructured biosensor were multi-layered graphene petal nanosheets (GPNs), Pt nanoparticles, and the biorecognition element (glucose oxidase) are all deposited in situ from a silicon- based substrate. The versatility of the biosensor is greatly enhanced by modulating the biosensor performance (i.e., sensitivity, detection limit, and linear sensing range) by manipulating the size of electrodeposited Pt nanoparticles on the GPNs. This work enables a robust sensor design that is capable of versatile glucose sensing for over one month with minimal interference from endogenous electroactive species (e.g., ascorbic acid, uric acid, acetaminophen) commonly found in human serum samples. A hybrid manganese dioxide/graphitic petal structure on carbon nanotube substrates achieves high specific capacitance, energy density, power density, and long cycle life for flexible supercapacitor application. Vertical nanoscale graphitic petals were prepared by microwave plasma chemical vapor deposition on commercial carbon nanotube substrates and subsequently coated with a thin layer of MnO2. The graphitic petal/carbon nanotube architecture without any binder provides an efficient scaffold for maximizing the electrochemical performance of MnO2. The MnO2/graphitic petal/carbon nanotube composite is a promising electrode material for high-performance supercapacitors.

IPC 8 full level

C01B 31/02 (2006.01); **B82B 1/00** (2006.01); **B82B 3/00** (2006.01); **B82Y 30/00** (2011.01); **B82Y 40/00** (2011.01); **C01B 31/04** (2006.01); **G01N 27/30** (2006.01); **G01N 27/327** (2006.01)

CPC (source: EP KR)

B82B 1/00 (2013.01 - KR); **B82B 3/0009** (2013.01 - KR); **B82Y 30/00** (2013.01 - EP KR); **B82Y 40/00** (2013.01 - EP KR); **C01B 32/186** (2017.07 - EP KR); **G01N 27/308** (2013.01 - EP KR); **G01N 27/3271** (2013.01 - EP KR); **G01N 27/3278** (2013.01 - EP KR)

Citation (search report)

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Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)

WO 2013066474 A2 20130510; **WO 2013066474 A3 20130808**; **WO 2013066474 A9 20130620**; CA 2845539 A1 20130510; EP 2744751 A2 20140625; EP 2744751 A4 20150805; KR 20140064872 A 20140528

DOCDB simple family (application)

US 2012051008 W 20120815; CA 2845539 A 20120815; EP 12845269 A 20120815; KR 20147006923 A 20120815