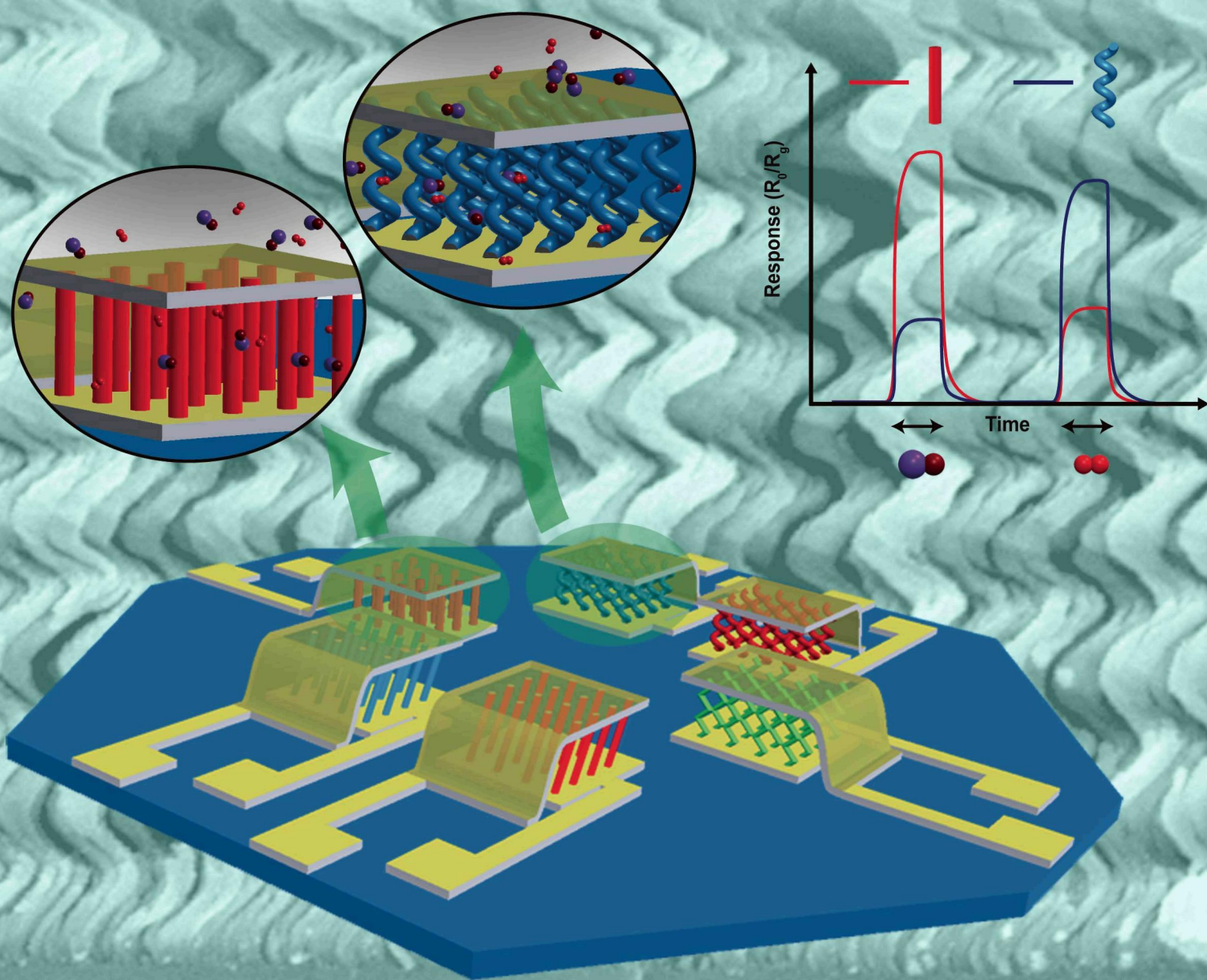


Analyst

www.rsc.org/analyst

Volume 138 | Number 2 | 21 January 2013 | Pages 373–712



ISSN 0003-2654

RSC Publishing

HOT ARTICLE

Jong Kyu Kim *et al.*

A near single crystalline TiO₂ nanohelix array: enhanced gas sensing performance and its application as a monolithically integrated electronic nose

IN THIS ISSUE

ISSN 0003-2654 CODEN ANALAO 138(2) 373-712 (2013)



Cover
See Qingtao Liu and Ben J. Boyd, pp. 391-409.
Image reproduced by permission of Ben J. Boyd from *Analyst*, 2013, **138**, 391.



Inside cover
See Jong Kyu Kim *et al.*, pp. 443-450.
Image reproduced by permission of Jong Kyu Kim from *Analyst*, 2013, **138**, 443.

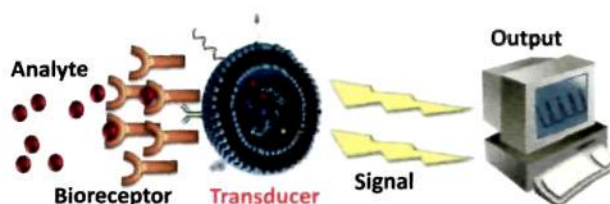
CRITICAL REVIEW

391

Liposomes in biosensors

Qingtao Liu and Ben J. Boyd*

Liposomes are promising recognition and amplification elements for biosensors; their potential application in future point of care devices is reviewed.



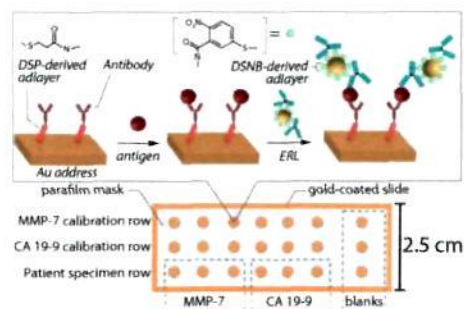
COMMUNICATIONS

410

Toward development of a surface-enhanced Raman scattering (SERS)-based cancer diagnostic immunoassay panel

Jennifer H. Granger, Michael C. Granger,*
Matthew A. Firpo, Sean J. Mulvihill and Marc D. Porter

Proteomic analyses of readily obtained human fluids (*e.g.*, serum, urine, and saliva) indicate that the diagnosis of complex diseases will be enhanced by the simultaneous measurement of multiple biomarkers from such samples.



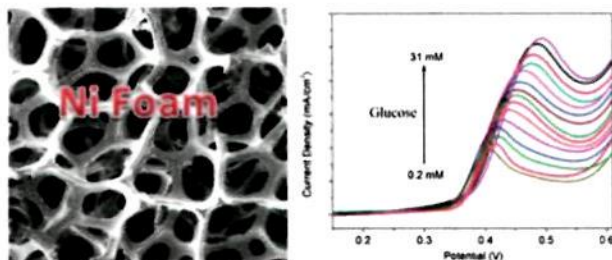
Федеральное государственное
бюджетное учреждение науки
Центральная научная библиотека
Уральского отделения
Российской академии наук (ЦНБ УрО РАН)

417

Ni foam: a novel three-dimensional porous sensing platform for sensitive and selective nonenzymatic glucose detection

Wenbo Lu, Xiaoyun Qin, Abdullah M. Asiri, Abdulrahman O. Al-Youbi and Xuping Sun*

We demonstrate the first use of Ni foam as a novel electrochemical sensing platform for nonenzymatic glucose detection. Ni foam not only acts as a working electrode, but also functions as an effective electrocatalyst for electrooxidation of glucose.

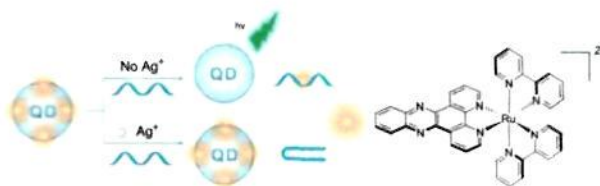


421

Label-free fluorescent DNA sensor for the detection of silver ions based on molecular light switch Ru complex and unmodified quantum dots

Wenliang Sun, Junliang Yao, Tianming Yao* and Shuo Shi*

Using molecular light switch Ru complex $\text{Ru}(\text{bpy})_2(\text{dppz})^{2+}$ and CdTe quantum dots, we have designed a label-free DNA fluorescent sensor for the detection of Ag^+ in aqueous solution.

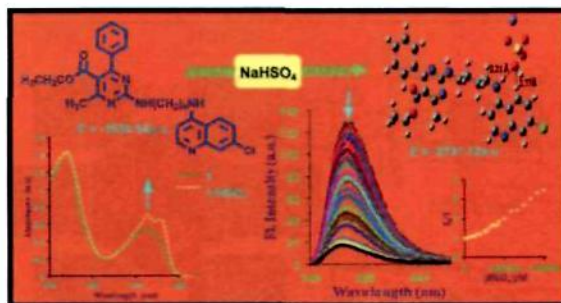


425

A 'turn-off' emission based chemosensor for HSO_4^- – formation of a hydrogen-bonded complex

Paramjit Kaur,* Hardeep Kaur and Kamaljit Singh*

A quinoline based sensor detects HSO_4^- via a static quenching mechanism which further gets support from the ^1H NMR and TD-DFT studies indicating the hydrogen bond formation between the quinoline functionality of the sensor and HSO_4^- .

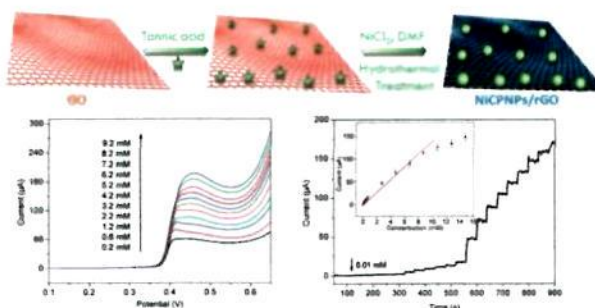


429

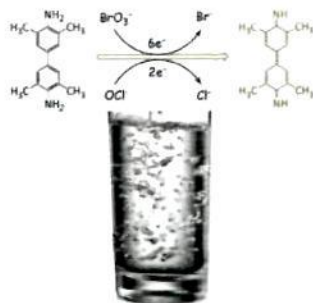
Facile synthesis of novel Ni(II)-based metal-organic coordination polymer nanoparticle/reduced graphene oxide nanocomposites and their application for highly sensitive and selective nonenzymatic glucose sensing

Wenbo Lu, Xiaoyun Qin, Abdullah M. Asiri, Abdulrahman O. Al-Youbi and Xuping Sun*

A novel NiCPNP/rGO-based sensor toward glucose detection with high sensitivity and selectivity is reported.



434

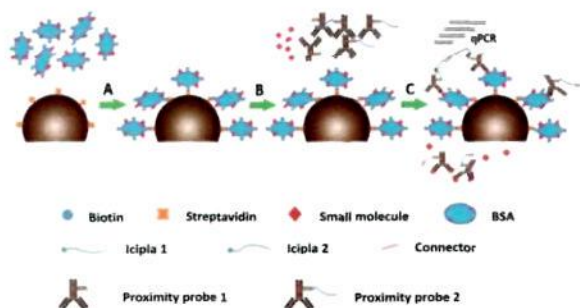


A simple yet effective chromogenic reagent for the rapid estimation of bromate and hypochlorite in drinking water

Jia Zhang and Xiurong Yang*

We present an efficient colorimetric platform for the rapid assay of bromate and hypochlorite in drinking water within 5 min at room temperature by the use of an economical chromogenic reagent.

438



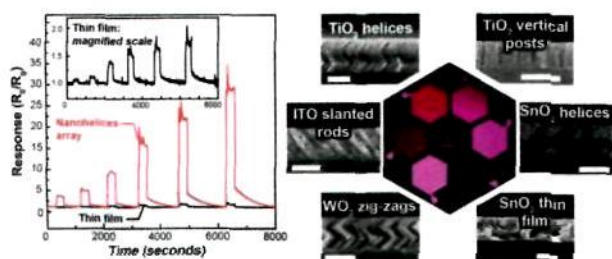
The development of an indirect competitive immunomagnetic-proximity ligation assay for small-molecule detection

Xuecheng Jiang, Zhenhong Zhu, Zhihao Sun, Luming Wang, Lixiao Zhou, Hanqiang Miao, Zhengting Zhang, Feng Shi and Chenggang Zhu*

The development of an indirect competitive immunomagnetic-proximity ligation assay (ICIPLA), which is a novel method for detecting small molecules, is described in this report.

PAPERS

443

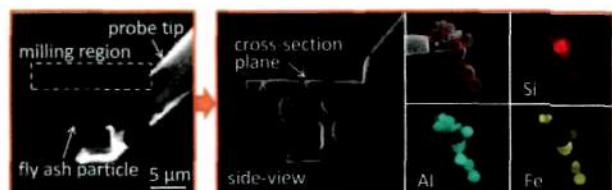


A near single crystalline TiO_2 nanohelix array: enhanced gas sensing performance and its application as a monolithically integrated electronic nose

Sunyong Hwang, Hyunah Kwon, Sameer Chhajer, Ji Won Byon, Jeong Min Baik, Jiseong Im, Sang Ho Oh, Ho Won Jang, Seok Jin Yoon and Jong Kyu Kim*

A near single crystalline TiO_2 nanohelix array simply fabricated by an oblique angle deposition method showed enhanced gas sensing performance.

451



Chemical imaging analysis of environmental particles using the focused ion beam/scanning electron microscopy technique: microanalysis insights into atmospheric chemistry of fly ash

Haihan Chen, Vicki H. Grassian, Laxmikant V. Saraf and Alexander Laskin*

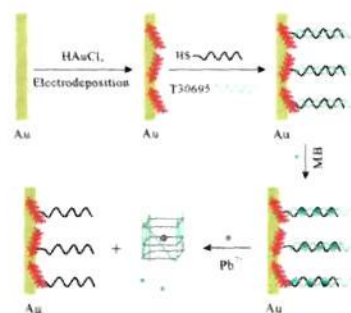
A focused ion beam/scanning electron microscopy system was applied for cross-sectioning of coal fly ash particles to explore element distribution within the interior of individual particles.

461

A selective amperometric sensing platform for lead based on target-induced strand release

Feng Li, Limin Yang, Mingqin Chen, Peng Li and Bo Tang*

A selective and sensitive amperometric sensing platform for Pb^{2+} was developed based on Pb^{2+} -induced disruption of a capture DNA–partly complementary strand duplex *via* the formation of a Pb^{2+} -stabilized G-quadruplex structure with methylene blue as the electrochemical indicator.

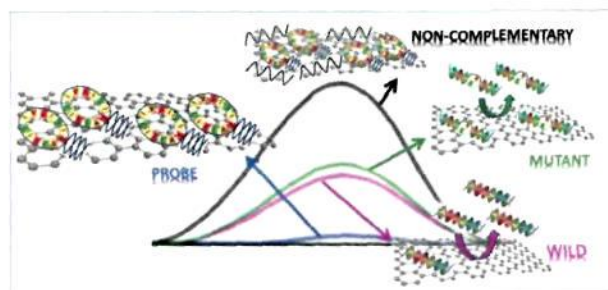


467

An insight into the hybridization mechanism of hairpin DNA physically immobilized on chemically modified graphenes

Adeline Huiling Loo, Alessandra Bonanni and Martin Pumera*

The hairpin DNA biorecognition mechanism resulting in an impedimetric signal change on graphene platforms is investigated by using differential pulse voltammetry (DPV).

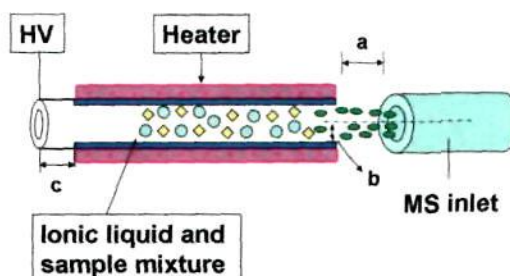


472

Thermal dissociation atmospheric chemical ionization ion trap mass spectrometry with a miniature source for selective trace detection of dimethoate in fruit juices

Yongzhong Ouyang, Xinglei Zhang, Jing Han, Xiali Guo, Zhiqiang Zhu, Huanwen Chen and Liping Luo*

Instead of conventional organic solvents and high voltage, an ionic liquid, a "green solvent", was employed to generate reagent ions.

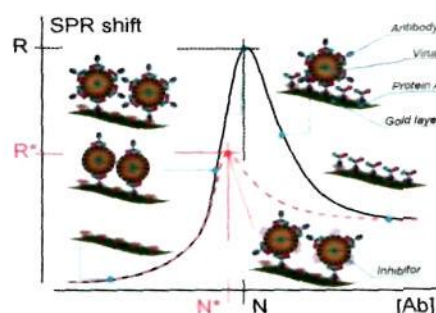


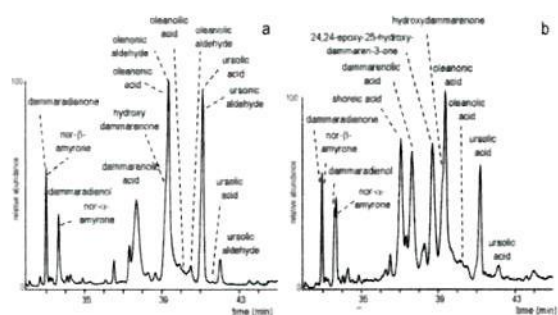
480

A simple SPR-based method for the quantification of the effect of potential virus inhibitors

Praskoviya M. Boltovets,* Olena M. Polischuk, Oleksiy G. Kovalenko and Boris A. Snopok

In this work we prove the appropriateness of the DVIFA application for composite multicomponent mixtures whose elements influence each other, in particular, those whose components differ substantially from each other in molecular mass and size.

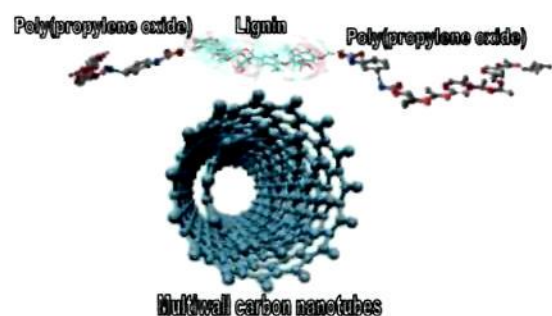




The role of organic and inorganic indoor pollutants in museum environments in the degradation of dammar varnish

Ilaria Bonaduce,* Marianne Odlyha, Francesca Di Girolamo, Susana Lopez-Aparicio, Terje Grøntoft and Maria Perla Colombini

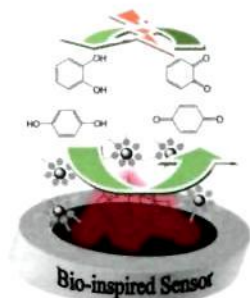
This paper investigates the effects of inorganic (NO_2 and O_3) and volatile organic acid (acetic acid) pollutants on the degradation of dammar varnish in museum environments.



Potentiometric chemical sensors from lignin-poly(propylene oxide) copolymers doped by carbon nanotubes

Alisa Rudnitskaya,* Dmitry V. Evtuguin, Luis C. Costa, M. Pedro F. Graça, António J. S. Fernandes, M. Rosario P. Correia, M. Teresa S. R. Gomes and J. A. B. P. Oliveira

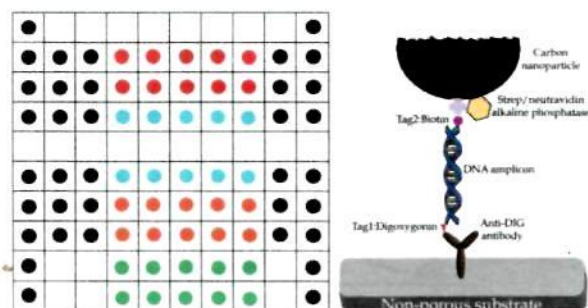
Lignin co-polymerized with poly(propylene oxide) and doped with carbon nanotubes is suggested as a sensing material for $\text{Cr}(\text{VI})$ detection.



A bio-inspired sensor based on surfactant film and Pd nanoparticles

Eduardo Zapp, Franciane D. Souza, Bruno S. Souza, Faruk Nome, Ademir Neves and Iolanda C. Vieira*

A new bio-inspired sensor for diphenol compounds was developed using a binuclear $\text{Fe}^{\text{III}}\text{Cu}^{\text{II}}$ complex combined with palladium nanoparticles stabilized in a zwitterionic surfactant.



Spot morphology of non-contact printed protein molecules on non-porous substrates with a range of hydrophobicities

Liyakat Hamid Mujawar, Willem Norde and Aart van Amerongen*

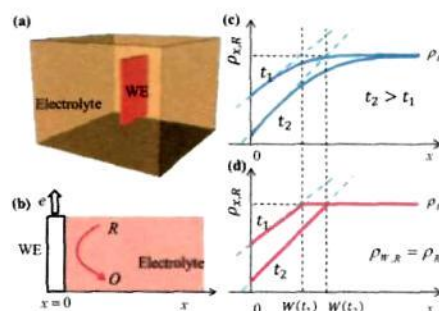
Non-contact inkjet printing technology is one of the most promising tools for producing microarrays.

525

A compact analytical formalism for current transients in electrochemical systems

Pradeep R. Nair and Muhammad A. Alam

A compact analytical formalism is proposed to predict the response of nanostructured electrodes to a wide variety of experiments like potential step voltammetry, linear sweep voltammetry, ultrasensitive redox detection of biomolecules, and scanning electrochemical microscopy.

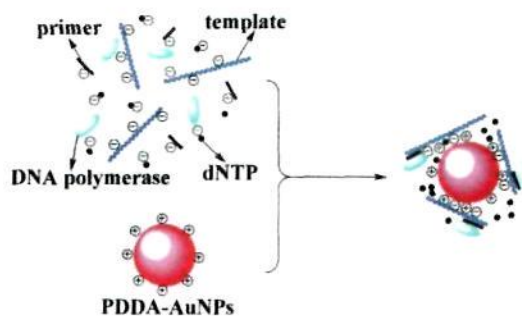


539

Effect of surface charge of PDDA-protected gold nanoparticles on the specificity and efficiency of DNA polymerase chain reaction

Longfei Yuan and Yujian He*

Poly (diallyl dimethylammonium) chloride (PDDA) and PDDA protected gold nanoparticles as novel additives can enhance the PCR specificity and efficiency.

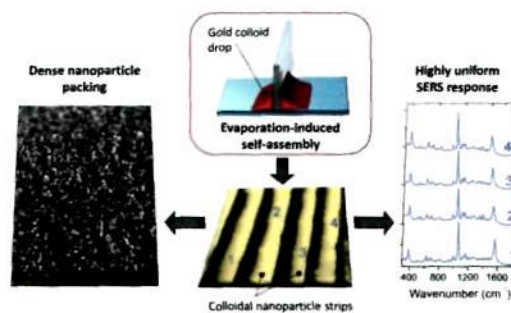


546

Reliable plasmonic substrates for bioanalytical SERS applications easily prepared by convective assembly of gold nanocolloids

Cosmin Farcau,* Monica Potara, Cosmin Leordean, Sanda Boca and Simion Astilean*

Gold nanoparticle strips of an homogeneous morphology were obtained by a simple convective self-assembly variant. These strips are SERS-active under multiple excitation lasers, and exhibit a highly uniform SERS response.

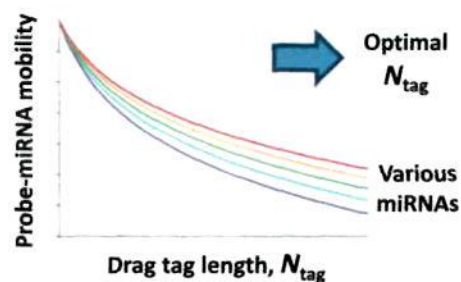


553

Theoretical estimation of drag tag lengths for direct quantitative analysis of multiple miRNAs (DQAMmiR)

Leonid T. Cherney and Sergey N. Krylov*

To better understand the regulatory roles of miRNA in biological functions and to use miRNA as molecular markers of diseases, we need to accurately measure amounts of multiple miRNAs in biological samples.

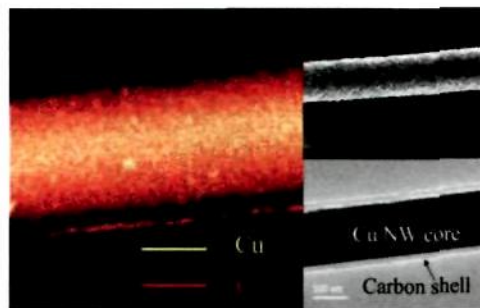


559

Copper@carbon coaxial nanowires synthesized by hydrothermal carbonization process from electroplating wastewater and their use as an enzyme-free glucose sensor

Yuxin Zhao, Zhaoyang He and Zifeng Yan*

A continuous flow hydrothermal carbonization process for preparing crystalline copper@carbon nanowires with large aspect ratio from electroplating wastewater and their application as enzyme-free glucose sensor have been discussed.

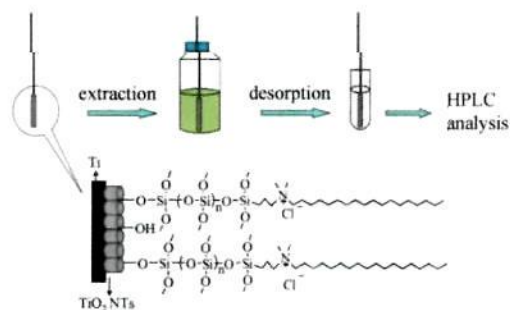


569

Development of octadecyl-functionalized-nanotubular TiO₂/Ti wire solid-phase microextraction fiber

Chunyan Chen, Shaolei Yang, Di Pan, Yiming Long, Zhihong Yan, Qingyun Cai* and Shouzhuo Yao*

A new octadecyl-functionalized SPME fiber was developed by using nanotubular TiO₂/Ti wire as the substrate.

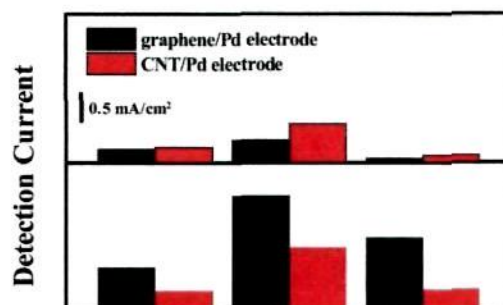


576

The effects of ionic liquid on the electrochemical sensing performance of graphene- and carbon nanotube-based electrodes

Chueh-Han Wang, Cheng-Hung Wu, Jia-Wun Wu, Ming-Tsung Lee, Jeng-Kuei Chang,* Ming-Der Ger and Chia-Liang Sun

With the addition of ionic liquid, detection sensitivity of the graphene-based electrode significantly improved, becoming greater than that of the CNT-based electrode.

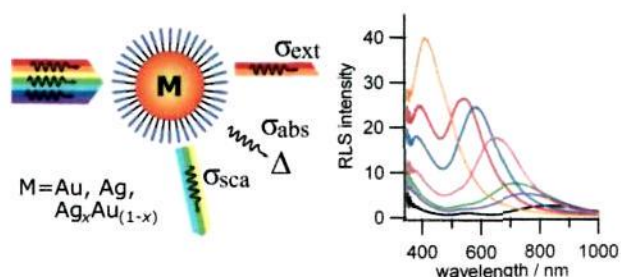


583

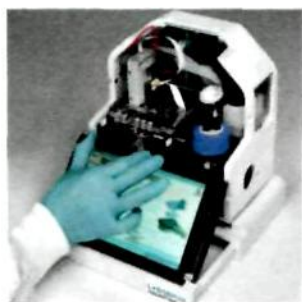
Resonant light scattering spectroscopy of gold, silver and gold-silver alloy nanoparticles and optical detection in microfluidic channels

Julien R. G. Navarro and Martinus H. V. Werts*

Quantitative spectroscopic measurement of light scattering facilitates characterisation of plasmonic nanoparticles and assemblies, and development of microfluidic detection schemes.



593

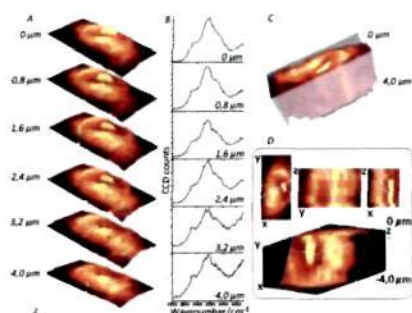


Real-time isothermal RNA amplification of toxic marine microalgae using preserved reagents on an integrated microfluidic platform

Maria-Nefeli Tsaloglou,^{*} Florian Laouenan, Christos-Moritz Loukas, Lisandro Gabriel Monsalve, Christine Thanner, Hywel Morgan, Jesus M. Ruano-López and Matthew C. Mowlem

A portable system with disposable cartridges containing gelled reagents is demonstrated using nucleic acid sequence-based amplification with an internal control.

603

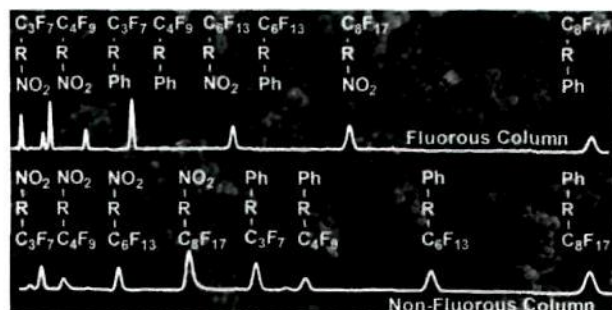


3D confocal Raman imaging of endothelial cells and vascular wall: perspectives in analytical spectroscopy of biomedical research

Katarzyna Majzner, Agnieszka Kaczor, Neli Kachamakova-Trojanowska, Andrzej Fedorowicz, Stefan Chlopicki and Malgorzata Baranska^{*}

Raman imaging was used to illustrate heterogeneity of a single endothelial cell and the vascular wall sample.

611

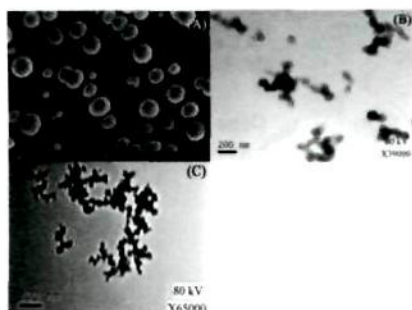


Development of fluororous porous polymer monolith (FPPM) for the capillary electrochromatographic separation of fluororous analytes based on fluororous-fluororous interaction

Zhenpo Xu, Graham T. T. Gibson and Richard D. Oleschuk^{*}

Analytes with perfluorinated tags were selectively separated by capillary electrochromatography on a porous polymer monolithic column containing perfluorinated functionality by taking advantage of fluororous-fluororous interaction.

620

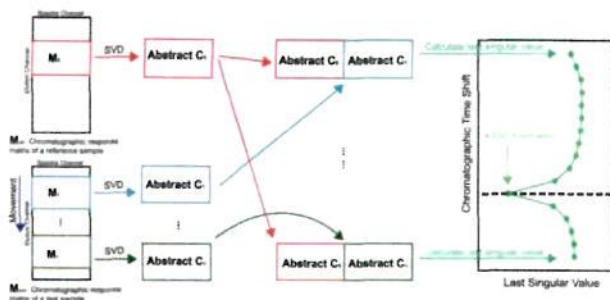


A novel amperometric immunosensor constructed with gold-platinum nanoparticles and horseradish peroxidase nanoparticles as well as nickel hexacyanoferrate nanoparticles

Qiang Zhu, Ruo Yuan,^{*} Yaqin Chai, Jing Han, Ya Li and Ni Liao

In this study, three nano-materials comprising gold-platinum nanoparticles (Au-PtNPs), horseradish peroxidase nanoparticles (HRPNPs) and nickel hexacyanoferrate nanoparticles (NiHCFNPs) were used to construct a signal-off immunosensor.

627

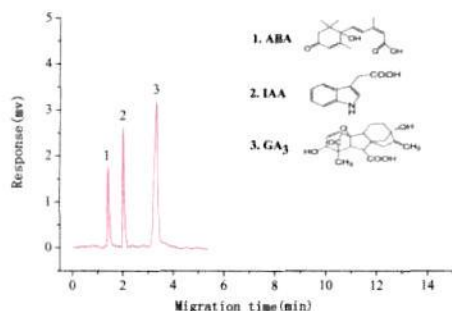


A novel chromatographic peak alignment method coupled with trilinear decomposition for three dimensional chromatographic data analysis to obtain the second-order advantage

Yong-Jie Yu, Hai-Long Wu,* Jing-Fang Niu, Juan Zhao, Yuan-Na Li, Chao Kang and Ru-Qin Yu

A new method was developed for aligning time shift problems for high-dimensional chromatographic data.

635



Rapid capillary electrochromatographic profiling of phytohormones on a hydrophilic interaction/strong anion-exchange mixed-mode monolith

Xucong Lin,* Yanping Li, Dongjie Xu, Chunmei Yang and Zenghong Xie*

A mixed-mode monolith for rapid and efficient electrochromatographic profiling of carboxylic phytohormones is presented.

642

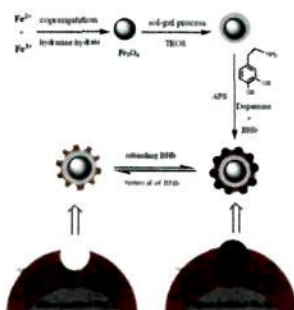


A gold nanorods-based fluorescent biosensor for the detection of hepatitis B virus DNA based on fluorescence resonance energy transfer

Xiaocui Lu, Xiao Dong, Keying Zhang, Xiaowei Han, Xian Fang and Yuzhong Zhang*

A fluorescence resonance energy transfer system containing gold nanorods and fluorescein for the detection of hepatitis B virus DNA sequences.

651

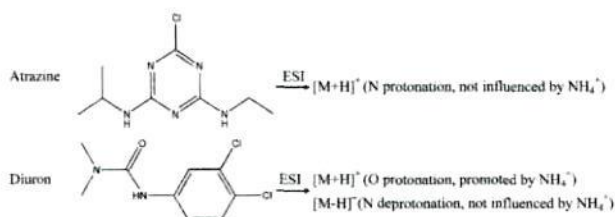


Polydopamine-based molecular imprinting on silica-modified magnetic nanoparticles for recognition and separation of bovine hemoglobin

Xiaoping Jia, Minli Xu, Yuzhi Wang,* Dan Ran, Shan Yang and Min Zhang

Polydopamine-based molecular imprinted film on silica- Fe_3O_4 nanoparticles shows relatively high adsorption capacity and excellent selectivity towards bovine hemoglobin.

659

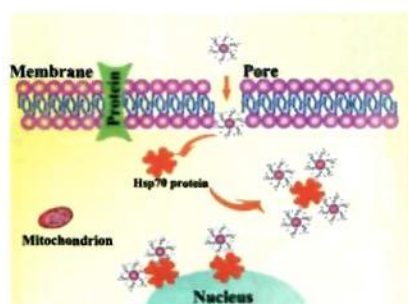


Effect of ammonium on liquid- and gas-phase protonation and deprotonation in electrospray ionization mass spectrometry

X. Jin Yang,* Yixin Qu, Qipeng Yuan, Pingyu Wan, Zhenxia Du, Dazhou Chen and Choon Wong

Ammonium ion promotes O-protonation but does not affect N-protonation and N-deprotonation of an analyte in electrospray ionization.

666

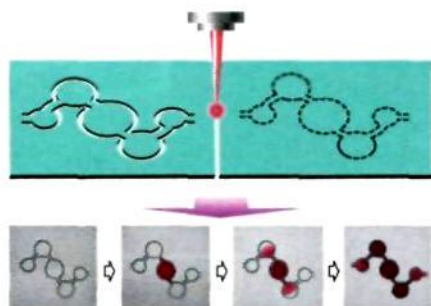


N-Acetylglucosamine biofunctionalized CdSeTe quantum dots as fluorescence probe for specific protein recognition

Fang-Fang Cheng, Guo-Xi Liang, Yuan-Yuan Shen, Rohit Kumar Rana and Jun-Jie Zhu*

A Hsp70 protein-targeted fluorescence probe was designed by incorporating GlcNAc onto Con A-conjugated CdSeTe QDs via specific binding affinity.

671

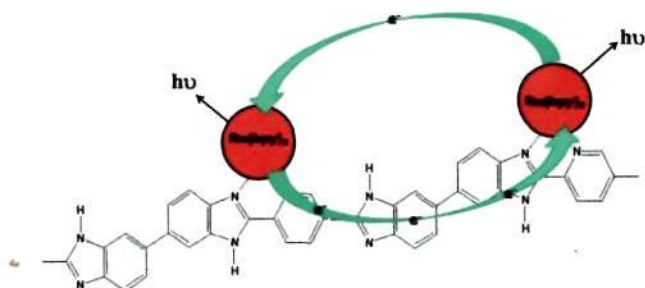


One-step patterning of hollow microstructures in paper by laser cutting to create microfluidic analytical devices

Jinfang Nie, Yuanzhi Liang, Yun Zhang,* Shangwang Le, Dunnan Li and Songbai Zhang*

This paper describes a simple laser cutting method for one-step patterning of hollow microstructures in paper to fabricate microfluidic analytical devices that are ready for use once the cutting process is finished.

677



Insights into electrochemiluminescent enhancement through electrode surface modification

Emmet J. O'Reilly, Tia E. Keyes, Robert J. Forster* and Lynn Dennany*

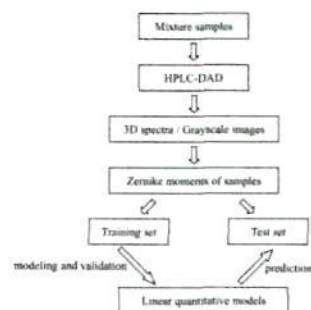
Insights into the influence of polymers on the electronic communication between ruthenium centres on electron transfer and electrochemiluminescence are investigated.

683

A simple approach to quantitative analysis using three-dimensional spectra based on selected Zernike moments

Hong Lin Zhai,* Yue Yuan Zhai, Pei Zhen Li and Yue Li Tian

Digital image processing using three-dimensional spectra obtained by high-performance liquid chromatography coupled with a diode array detector for quantitative analysis.

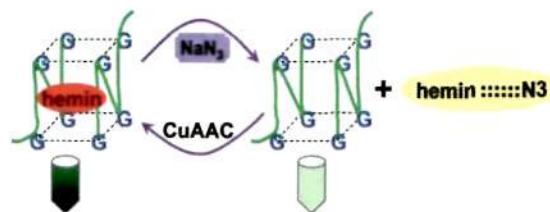


688

Novel colorimetric molecular switch based on copper(I)-catalyzed azide–alkyne cycloaddition reaction and its application for flumioxazin detection

Lidan Xie, Hanye Zheng, Wenmei Ye, Suyan Qiu, Zhenyu Lin,* Longhua Guo, Bin Qiu and Guonan Chen*

A novel colorimetric switch and sensitive and selective sensor for pesticides with alkynyl groups has been developed based on the copper(I)-catalyzed azide–alkyne cycloaddition (CuAAC) reaction.

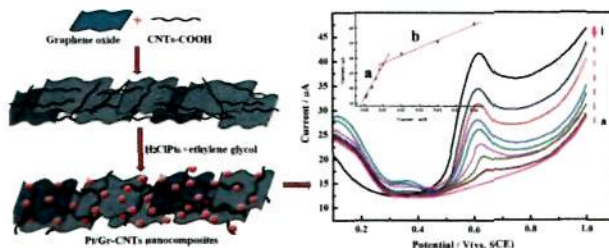


693

Pt/graphene–CNTs nanocomposite based electrochemical sensors for the determination of endocrine disruptor bisphenol A in thermal printing papers

Zhixiang Zheng, Yongling Du, Zaihua Wang, Qingliang Feng and Chunming Wang*

We describe a simple method for the preparation of the Pt/Gr–CNTs nanocomposite, and describes a novel, simple method for the highly sensitive and selective detection of bisphenol A using Pt/Gr–CNTs as biosensing probes.



702

A novel colorimetric biosensor for monitoring and detecting acute toxicity in water

Junfeng Zhai, Daming Yong, Jing Li and Shaojun Dong*

A sensitive, colorimetric microorganism biosensor is designed for monitoring and detecting water toxicity.

