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HOT ARTICLE

Wei W. Yu and Ian M. White

Inkjet-printed paper-based SERS dipsticks and swabs for trace chemical detection



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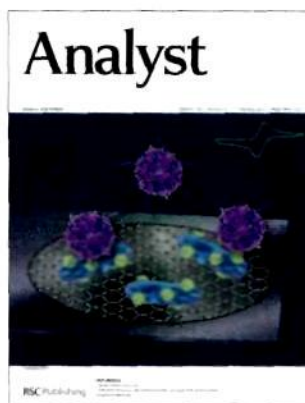
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ISSN 0003-2654 CODEN ANALAO 138(4) 965-1272 (2013)



Cover

See Wei W. Yu and Ian M. White, pp. 1020-1025.
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Inside cover

See Jaime Castillo-León *et al.*, pp. 1026-1031.
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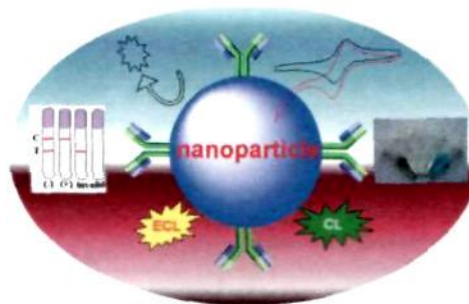
MINIREVIEW

981

Nanoparticle-based immunoassays in the biomedical field

Dianping Tang,* Yuling Cui and Guonan Chen

This minireview summarizes recent advances in nanoparticle-based electrochemical, optical, mass-sensitive, colorimetric and immunodipstick assays, focusing on novel concepts and promising applications.



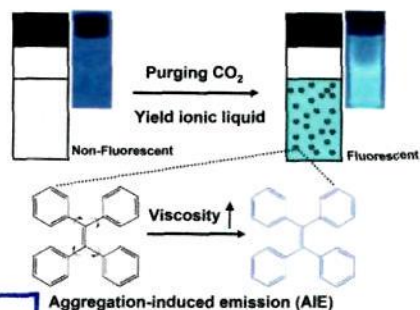
COMMUNICATIONS

991

Amidine-based fluorescent chemosensor with high applicability for detection of CO₂: A facile way to "see" CO₂

Tong Tian, Xi Chen, Hong Li, Yao Wang,* Lin Guo* and Lei Jiang

An amidine-based fluorescent chemosensor for CO₂ has been prepared and has unique sensitivity to CO₂, extraordinarily high water-resistance and no issue with carbon monoxide-interference.



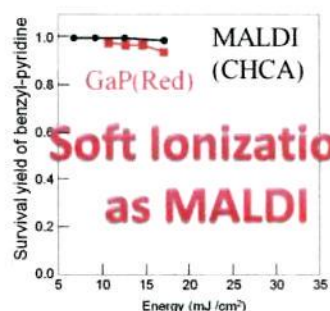
Федеральное государственное
бюджетное учреждение науки
Центральная научная библиотека
Уральского государственного
Российской академии наук (ИГиЛ) РАН

995

Suitability of GaP nanoparticles as a surface-assisted laser desorption/ionization mass spectroscopy inorganic matrix and their soft ionization ability

Tetsu Yonezawa,* Hiroki Tsukamoto, Shinji Hayashi, Yuki Myojin, Hideya Kawasaki and Ryuichi Arakawa

Surface-assisted laser desorption/ionization time-of-flight mass spectrometry (SALDI-TOF-MS) with a high soft-ionization ability using GaP nanoparticles (NPs) prepared by a gas evaporation method was investigated on polyethylene glycols (PEGs).

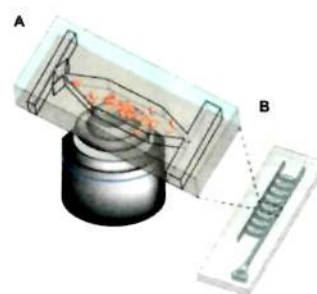


1000

A microfluidic microbial culture device for rapid determination of the minimum inhibitory concentration of antibiotics

Rika Takagi, Junji Fukuda, Keiji Nagata, Yutaka Yawata, Nobuhiko Nomura and Hiroaki Suzuki*

A microfluidic device was developed for rapid determination of the minimum inhibitory concentration (MIC) of antibiotics against bacteria.

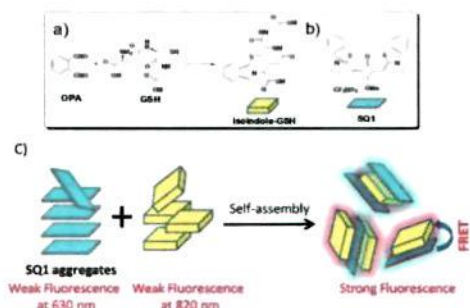


1004

Near-infrared fluorescent detection of glutathione via reaction-promoted assembly of squaraine-analyte adducts

Yongqian Xu,* Benhao Li, Pan Han, Shiguo Sun* and Yi Pang*

The first "off-on" dual-output fluorescent assay based on reaction-promoted self-assembly approach for GSH recognition in near infrared region over other relative thiols including cysteine and homocysteine was constructed with high selectivity and large Stokes shift.

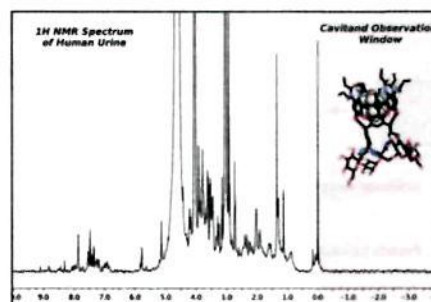


1008

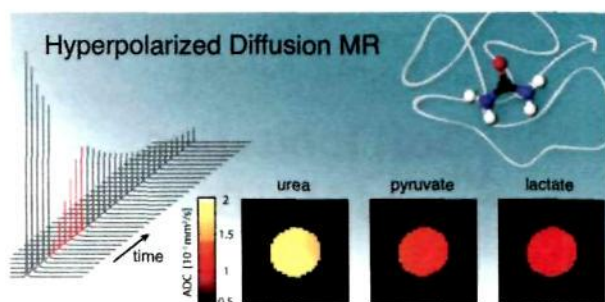
¹H NMR detection of small molecules in human urine with a deep cavitand synthetic receptor

Daniel A. Ryan and Julius Rebek, Jr.*

A deep cavitand facilitates ¹H NMR detection of small molecules in human urine by providing signals upfield of the biofluid.



1011

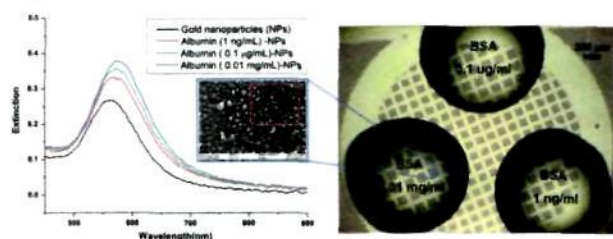


Diffusion MR of hyperpolarized ¹³C molecules in solution

Bertram L. Koelsch, Kayvan R. Keshari, Tom H. Peeters, Peder E. Z. Larson, David M. Wilson and John Kurhanewicz*

We demonstrate the feasibility of using hyperpolarized ¹³C diffusion weighted MR to accurately measure and image real-time molecular transport phenomena.

1015



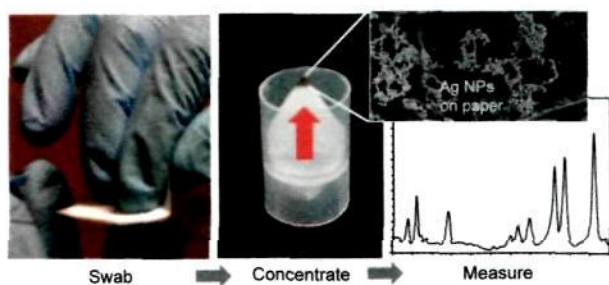
A facile and cost-effective TEM grid approach to design gold nano-structured substrates for high throughput plasmonic sensitive detection of biomolecules

Kun Jia, Jean Louis Bijeon, Pierre Michel Adam and Rodica Elena Ionescu*

LSPR detection of three concentrations of bovine serum albumin on a gold grafted TEM-grid on a glass substrate.

PAPERS

1020

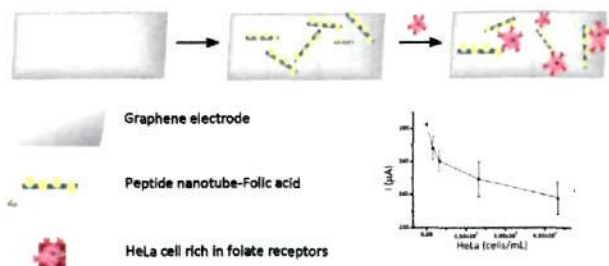


Inkjet-printed paper-based SERS dipsticks and swabs for trace chemical detection

Wei W. Yu and Ian M. White*

We demonstrate a surface swab and lateral-flow dipstick that includes an inkjet-printed surface-enhanced Raman spectroscopy (SERS) substrate for analyte detection.

1026



Detection of cancer cells using a peptide nanotube-folic acid modified graphene electrode

John J. Castillo, Winnie E. Svendsen, Noemi Rozlosnik, Patricia Escobar, Fernando Martínez and Jaime Castillo-León*

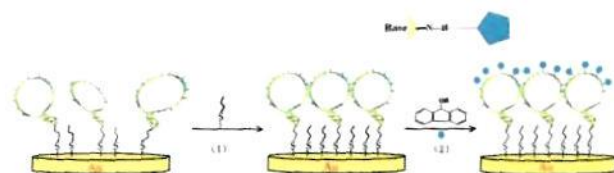
Preparation of a graphene electrode modified with a new conjugate of peptide nanotubes and folic acid for the selective detection of HeLa cells over-expressing folate receptors.

1032

Electrochemical detection of 9-hydroxyfluorene based on the direct interaction with hairpin DNA

Gang Liang, Xiaohong Li* and Xinhui Liu*

Schematic representation of hairpin DNA for the detection of 9-hydroxyfluorene (9-OHFLU) based on the interaction with exposed nucleobases through hydrogen bonds.

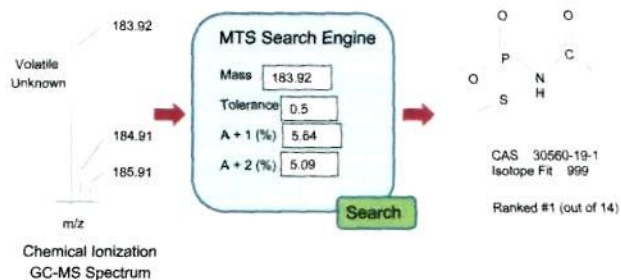


1038

Identification of volatile and semivolatile compounds in chemical ionization GC-MS using a Mass-To-Structure (MTS) Search Engine with integral isotope pattern ranking

Wenta Liao and William M. Draper*

The mass-to-structure or MTS Search Engine is an Access 2010 database containing theoretical molecular mass information for 19 438 compounds assembled from common sources such as the Merck Index, pesticide and pharmaceutical compilations, and chemical catalogues.

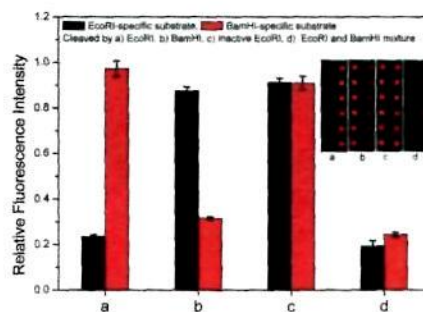


1048

Microarray-based fluorescence assay of endonuclease functionality and inhibition

Lan Ma, Min Su, Tao Li and Zhenxin Wang*

A double-strand DNA microarray-based fluorescence assay has been developed for studying endonuclease functionality and inhibition.

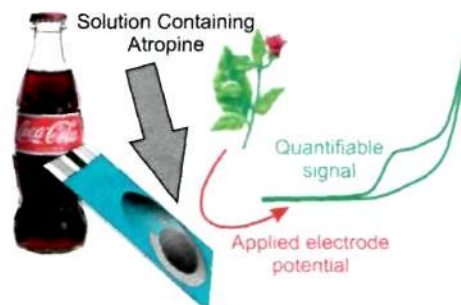


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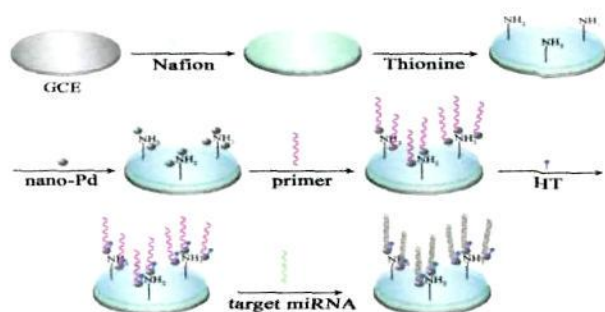
Forensic electrochemistry: sensing the molecule of murder atropine

Ouissam Ramdani, Jonathan P. Metters, Luiz Carlos S. Figueiredo-Filho, Orlando Fatibello-Filho and Craig E. Banks*

The sensing of the molecule of murder atropine is shown to be possible using disposable screen printed electrodes.



1060

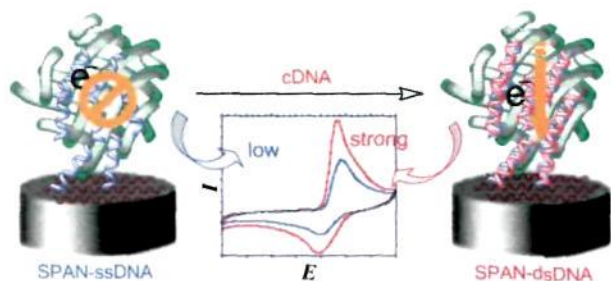


A novel label-free electrochemical microRNA biosensor using Pd nanoparticles as enhancer and linker

Xiaoyan Wu, Yaqin Chai,* Ruo Yuan,* Huilan Su and Jing Han

A novel, label-free amperometric biosensor for the detection of microRNA-155 based on the conductive self-assembled multilayer comprised of Nafion, thionine and Pd nanoparticles was successfully prepared.

1067

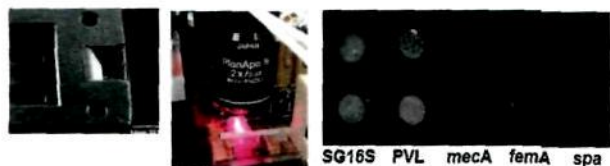


Conjugated self-doped polyaniline–DNA hybrid as trigger for highly sensitive reagentless and electrochemical self-signal amplifying DNA hybridization sensing

Yuwei Hu, Tao Yang,* Qianhe Li, Qian Guan and Kui Jiao*

Electrochemical self-signals of SPAN mediated by ssDNA and dsDNA demonstrate DNA hybridization with label-free, reagentless features.

1075

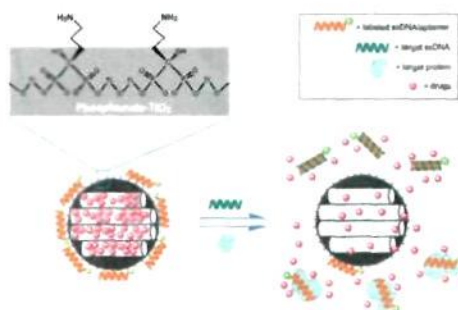


Identification of methicillin-resistant *Staphylococcus aureus* using an integrated and modular microfluidic system

Yi-Wen Chen, Hong Wang, Mateusz Hupert and Steven A. Soper*

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a major cause of hospital-acquired (HA-MRSA) infection worldwide.

1084



Mesoporous phosphonate–TiO₂ nanoparticles for simultaneous bioresponsive sensing and controlled drug release

Hui Li, Tian-Yi Ma, De-Ming Kong* and Zhong-Yong Yuan

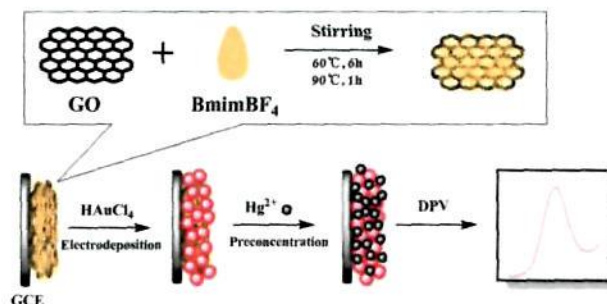
A smart system of hybrid phosphonate–TiO₂ mesoporous nanostructures capped with fluorescence-labeled oligonucleotides, realizing simultaneous and highly-efficient DNA/protein detection and custom-made drug delivery, which is expected to bring remarkable improvement for clinical diagnostics and treatment.

1091

A functional graphene oxide-ionic liquid composites–gold nanoparticle sensing platform for ultrasensitive electrochemical detection of Hg^{2+}

Na Zhou, Jinhua Li, Hao Chen, Chunyang Liao and Lingxin Chen*

An anodic stripping voltammetric method based on coating of gold nanoparticles and ionic liquid functionalized graphene oxide modified glassy carbon electrode for ultrasensitive detection of Hg^{2+} .

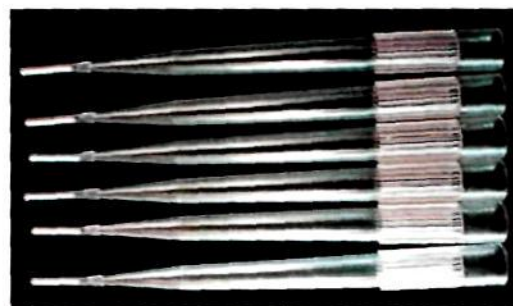


1098

Solid phase extraction of proteins from buffer solutions employing capillary-channeled polymer (C-CP) fibers as the stationary phase

Carolyn Q. Burdette and R. Kenneth Marcus*

Polypropylene (PP) capillary-channeled polymer (C-CP) fibers are employed as sorbents in solid phase extraction (SPE) of a variety of proteins from 150 mM PBS buffer solutions and synthetic urine and saliva.

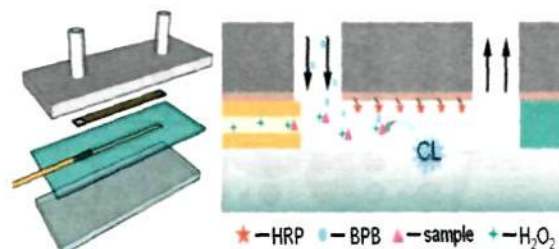


1107

A novel enzyme-immobilized flow cell used as end-column chemiluminescent detection interface in open-tubular capillary electrochromatography

Haoyue Xie, Zuorong Wang, Weijun Kong, Lin Wang and Zhifeng Fu*

A novel enzyme-immobilized flow-through interface was designed for sensitive end-column chemiluminescent detection in open-tubular capillary electrochromatography.

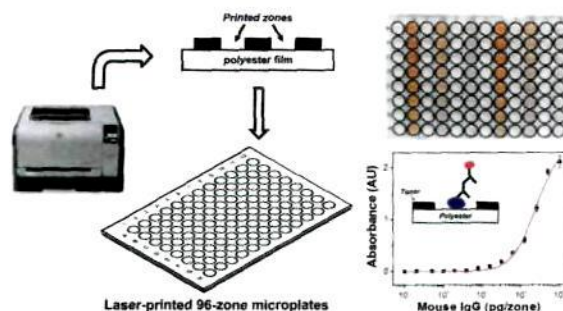


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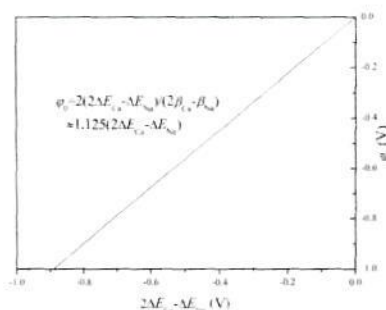
Laser-printing of toner-based 96-microzone plates for immunoassays

Karoliny Almeida Oliveira, Cristina Rodrigues de Oliveira, Lucimeire Antonelli da Silveira and Wendell Karlos Tomazelli Coltro*

A laser-printing technology was used to produce 96-microzone toner plates for immunoassays. Toner microplates were produced in less than 2 minutes using only a computer equipped with a laser-printer and transparency sheets.



1122

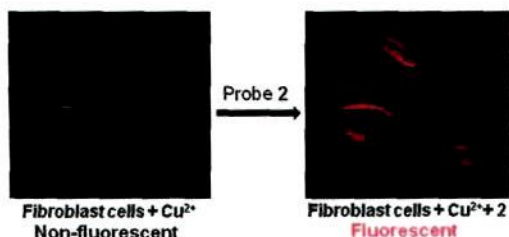


Combined determination of surface properties of nano-colloidal particles through ion selective electrodes with potentiometer

Xinmin Liu, Hang Li,* Rui Li, Rui Tian and Chenyang Xu

Surface potential of charged nano-colloidal particles were determined by potentiometry using Na⁺- and Ca²⁺-selective electrodes, the other properties can be calculated simultaneously using surface potential value.

1130

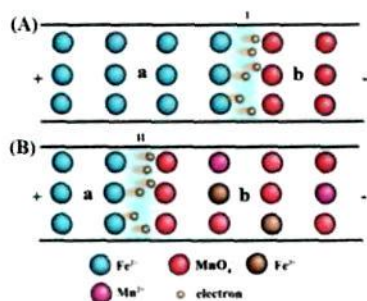


Solvent-assisted selective detection of sub-micromolar levels of Cu²⁺ ions in aqueous samples and live-cells

Narendra Reddy Chereddy, Subramaniyan Janakipriya, Purna Sai Korrapati, Sathiah Thennarasu* and Asit Baran Mandal*

Hard and soft acid base concept and effect of solvent system are explored to develop a Cu²⁺-selective chemosensor.

1137

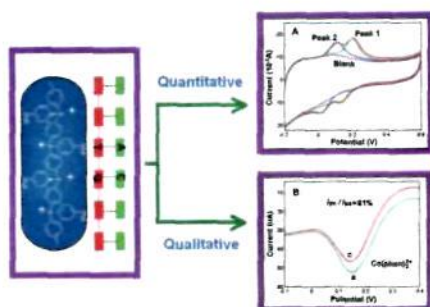


Model creation of moving redox reaction boundary in agarose gel electrophoresis by traditional potassium permanganate method

Hai-Yang Xie, Qian Liu, Jia-Hao Li, Liu-Yin Fan and Cheng-Xi Cao*

A novel moving redox reaction boundary model was developed for studying electrophoretic behaviors of analytes involving redox reaction on the principle of moving reaction boundary.

1141



A novel dsDNA/polydiphenylamine-4-sulfonic acid electrochemical biosensor for selective detection of the toxic catechol and related DNA damage

Pingping Wang, Yongnian Ni* and Serge Kokot*

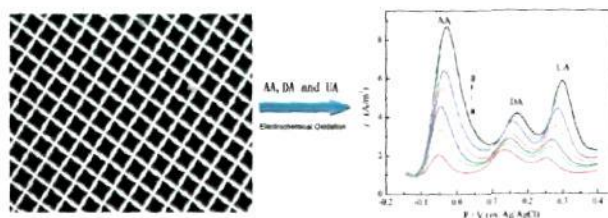
A novel biosensor, dsDNA/PDPASA/GCE, was developed for the analysis of catechol; the DNA damage caused by both catechol and its redox products was evaluated.

1149

Poly(3,4-ethylenedioxythiophene)-modified Ni/silicon microchannel plate electrode for the simultaneous determination of ascorbic acid, dopamine and uric acid

Shiji Yu, Chunhua Luo,* Lianwei Wang, Hui Peng* and Ziqiang Zhu

A Ni/silicon microchannel plate electrode modified with poly(3,4-ethylenedioxythiophene) was successfully fabricated and used for the simultaneous determination of ascorbic acid, dopamine and uric acid.

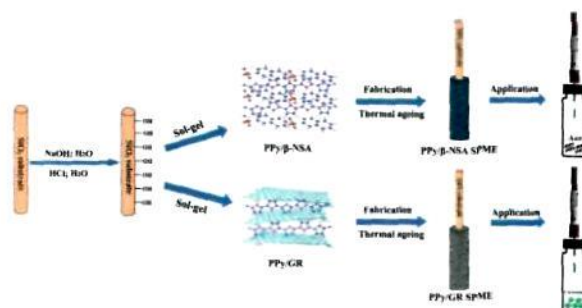


1156

Preparation of polypyrrole composite solid-phase microextraction fiber coatings by sol-gel technique for the trace analysis of polar biological volatile organic compounds

Zhuomin Zhang,* Li Zhu, Yunjian Ma, Yichun Huang and Gongke Li*

Two novel polypyrrole (PPy) composite SPME fiber coatings including PPy/ β -naphthalenesulfonic acid and PPy/graphene SPME fiber coatings have been prepared by a simple, rapid and stable sol-gel technique.

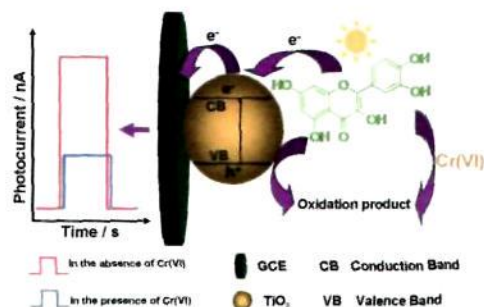


1167

A subnanomole level photoelectrochemical sensing platform for hexavalent chromium based on its selective inhibition of quercetin oxidation

Hongbo Li, Jing Li, Wei Wang, Zhanjun Yang, Qin Xu and Xiaoya Hu*

A novel photoelectrochemical sensing strategy for Cr(VI) was first constructed based on its selective inhibition of quercetin oxidation.

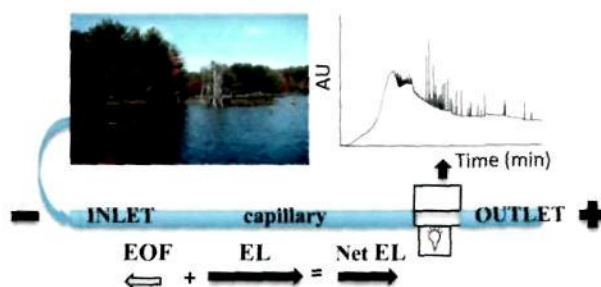


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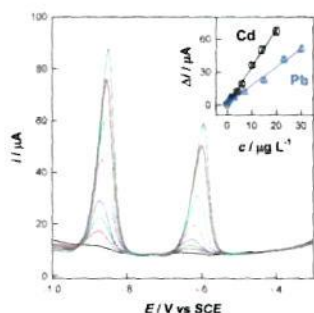
An enhanced capillary electrophoresis method for characterizing natural organic matter

Barbara A. Cottrell, Wei Ran Cheng, Buan Lam, William J. Cooper and Andre J. Simpson*

Natural organic matter (NOM) is ubiquitous and is one of the most complex naturally occurring mixtures.



1180

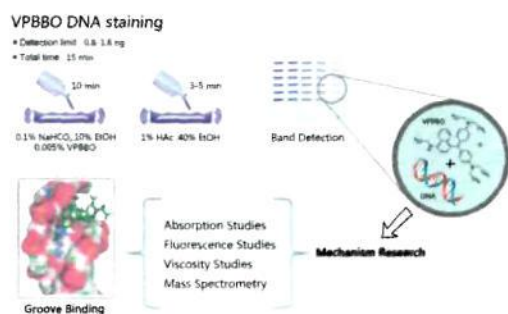


Thiol-ene chemistry guided preparation of thiolated polymeric nanocomposite for anodic stripping voltammetric analysis of Cd^{2+} and Pb^{2+}

Zhaohong Su, Ying Liu, Yi Zhang, Qingji Xie,* Li Chen, Yi Huang, Yingchun Fu, Yue Meng, Xuejiao Li, Ming Ma and Shouzhao Yao

Thiol-ene chemistry guided preparation of a thiolated polymeric nanocomposite for ASV determination of Cd^{2+} and Pb^{2+} on a glassy carbon electrode.

1187

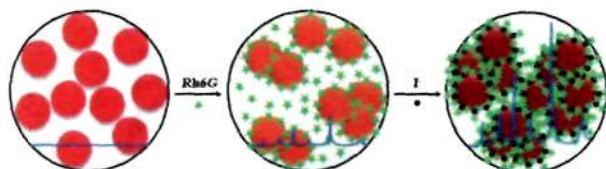


A shortcut organic dye-based staining method for the detection of DNA both in agarose and polyacrylamide gel electrophoresis

Weitao Cong, Mao Chen, Zhongxin Zhu, Zhiguo Liu, Jia Nan, Weijian Ye, Maowei Ni, Ting Zhao and Litai Jin*

DNA staining method for gel electrophoresis using Victoria Pure Blue BO and study of the related binding mechanism between the dye and DNA by MS and molecular docking.

1195

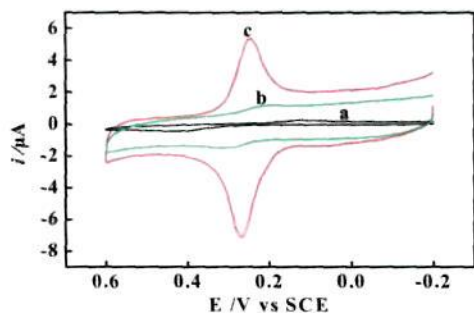


A surface enhanced Raman scattering probe for highly selective and ultra sensitive detection of iodide in water and salt samples

Samuel S. R. Dasary, Paresh Chandra Ray, Anant Kumar Singh, Tahir Arbnesi, Hongtao Yu and Dulal Senapati*

SERS probe for iodide detection.

1204



A dopamine sensor based on a methoxypolyethylene glycol polymer covalently modified glassy carbon electrode

Yanying Wu, Lili Cui, Ying Liu, Guojun Lv, Tao Pu, Dajun Liu and Xingquan He*

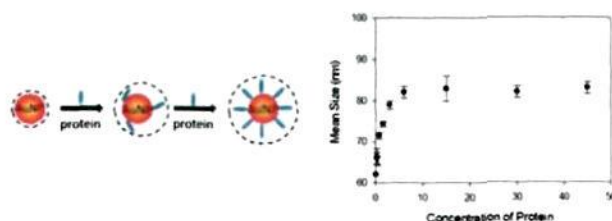
The preconcentration effect of MPEG film on dopamine obviously improved performances of the fabricated sensor for the detection of dopamine.

1212

Monitoring gold nanoparticle conjugation and analysis of biomolecular binding with nanoparticle tracking analysis (NTA) and dynamic light scattering (DLS)

Andre E. James and Jeremy D. Driskell*

Nanoparticle tracking analysis (NTA) and dynamic light scattering (DLS) are compared as tools to study bioconjugation and protein–protein interactions.

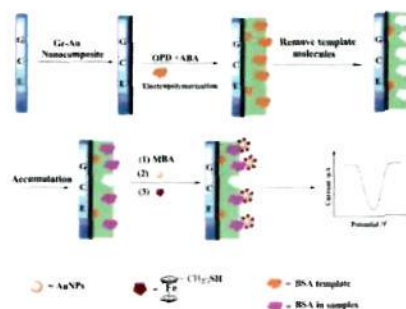


1219

Sensing of glycoprotein via a biomimetic sensor based on molecularly imprinted polymers and graphene–Au nanoparticles

Xindong Wang, Jing Dong, Huami Ming and Shiyun Ai*

A highly sensitive biomimetic sensor for detection of glycoprotein based on molecularly imprinted polymers and graphene–Au nanoparticles.

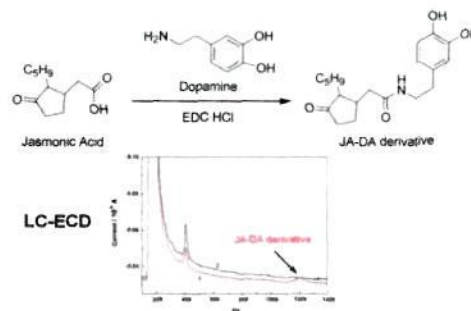


1226

Determination of endogenous jasmonic acid in plant samples by liquid chromatography–electrochemical detection based on derivatization with dopamine

Shanshan Xie, Fang Wang and Zilin Chen*

A novel electrochemical derivatization with dopamine has been developed and successfully applied to the analysis of endogenous jasmonic acid in wintersweet flowers and rice florets by liquid chromatography coupled with electrochemical detection.

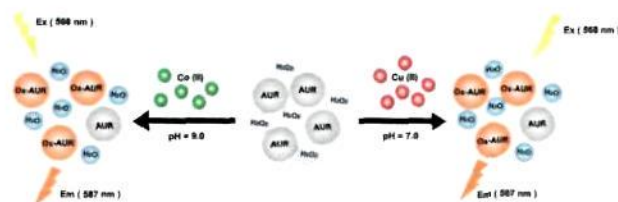


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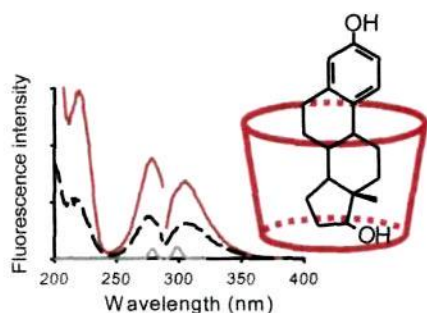
A highly selective and sensitive fluorescence assay for determination of copper(II) and cobalt(II) ions in environmental water and toner samples

Chia-Yi Tsai and Yang-Wei Lin*

Fluorescence sensing of Cu^{2+} and Co^{2+} ions using the AUR–hydrogen peroxide system.



1239

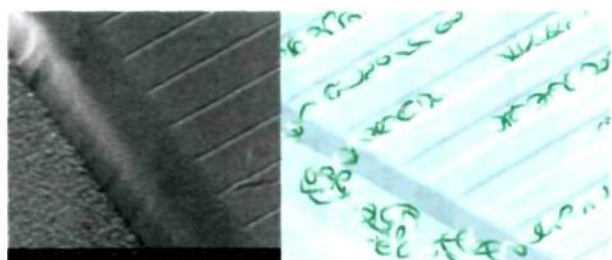


Spectrofluorimetric study of estrogen-cyclodextrin inclusion complexes in aqueous systems

Rocío L. Pérez and Graciela M. Escandar*

The strong interaction between estrogens and selected cyclodextrins in the absence of organic solvents is demonstrated through a spectrofluorimetric study. The formed complexes would be of interest in analytical areas based on green chemicals.

1249

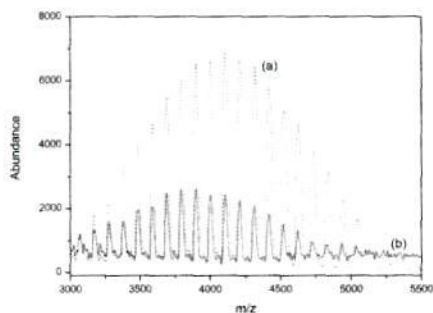


DNA barcoding via counterstaining with AT/GC sensitive ligands in injection-molded all-polymer nanochannel devices

Peter Friis Østergaard, Marco Matteucci, Walter Reisner and Rafael Taboryski*

Fluorescent profiles are obtained by counterstaining of molecules extended in nanochannels using inexpensive all polymer chips fabricated by injection molding.

1256

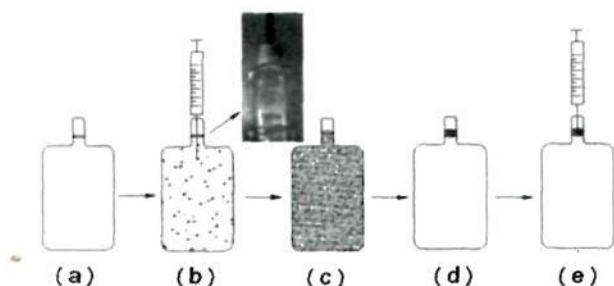


Novel co-matrix systems for the MALDI-MS analysis of polystyrene using a UV absorber and stabilizer

Sung-Seen Choi* and Hye-Seung Chung

Co-matrix systems composed of a UV absorber and a UV stabilizer applied to the analysis of polystyrene (PS) using a matrix-assisted laser desorption/ionization-mass spectrometer (MALDI-MS) equipped with a N_2 laser (337 nm) as the light source were investigated.

1262



Injection-ultrasound-assisted emulsification microextraction based on using low-density organic solvent followed by high-performance liquid chromatography for the determination of pyrethroids in water samples

Kailin Xu, Bing Liang,* Yanfang Li, Yuan Cheng and Yuyan Feng

Combination of dispersion by microporous syringe with manual shaking during sonication improved the efficiency of IUSAEME using low-density solvents.