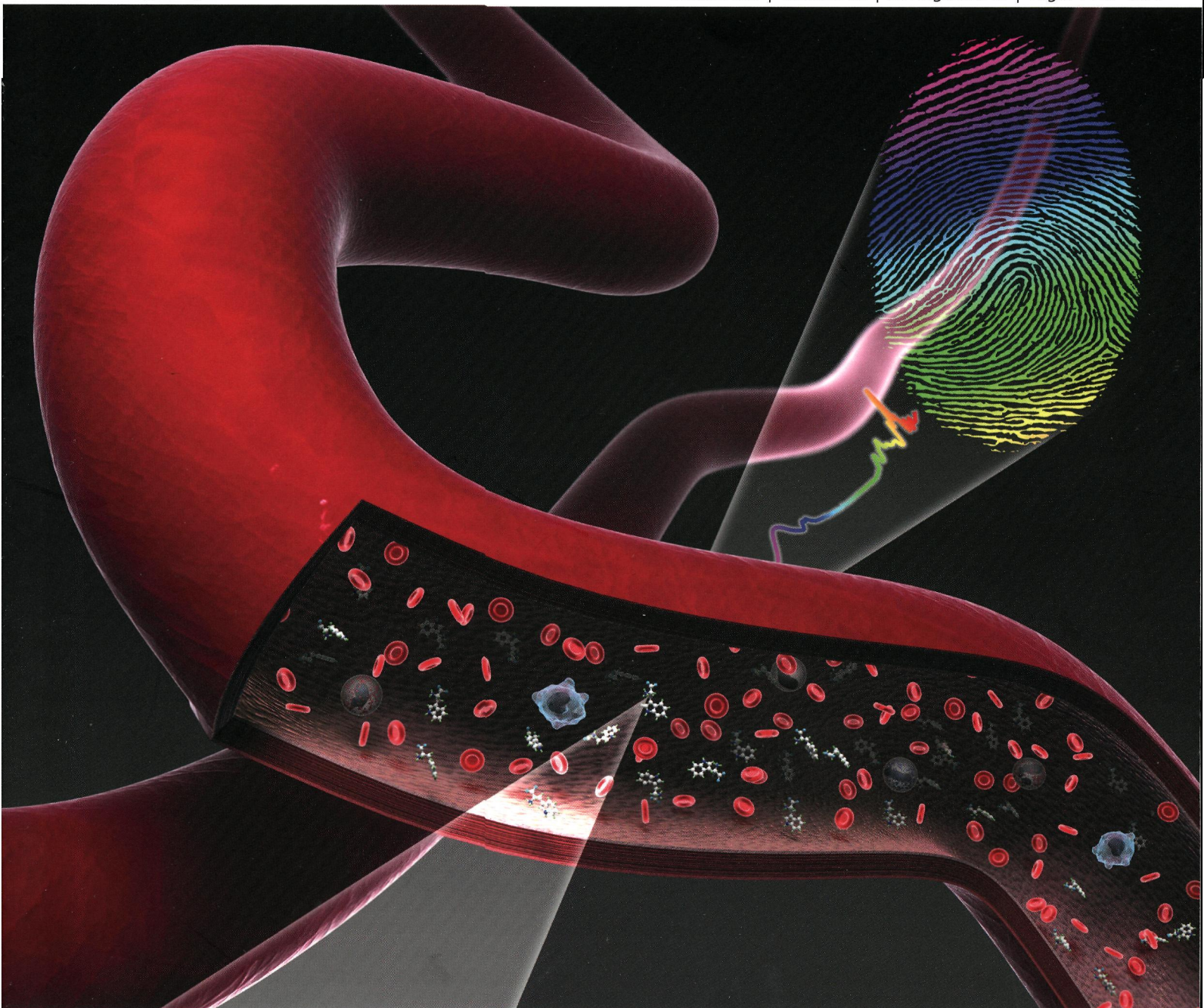


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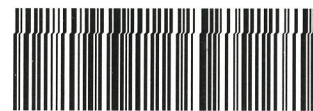
ISSN 0003-2654

RSC Publishing

PAPER

C. A. Tony Buffington *et al.*

A bloodspot-based diagnostic test for fibromyalgia syndrome and related disorders



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IN THIS ISSUE

ISSN 0003-2654 CODEN ANALAO 138(16) 4413–4694 (2013)



Cover

See C. A. Tony Buffington *et al.*, pp. 4453–4462.
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Inside cover

See Loïc Bertrand *et al.*, pp. 4463–4469.
Image reproduced by permission of Loïc Bertrand from *Analyst*, 2013, **138**, 4463.

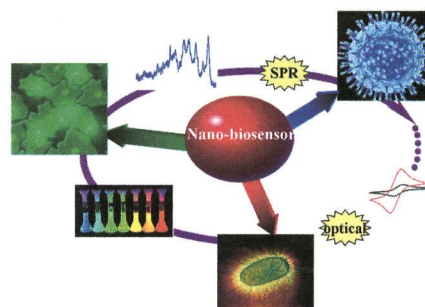
MINIREVIEW

4427

Advances in nano-scaled biosensors for biomedical applications

Jianling Wang, Guihua Chen, Hui Jiang, Zhiyong Li* and Xuemei Wang*

This review focuses on the recent advances of nano-scaled biosensors for disease diagnosis and bio-marking, including their efficient utilization in bio-imaging and the monitoring of pathological cells and viruses as well as pathogenic bacteria.



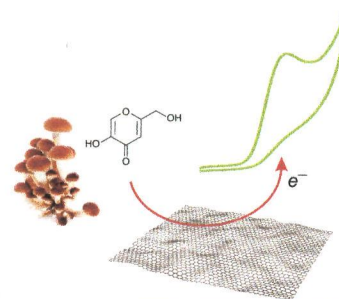
COMMUNICATIONS

4436

Exploring the origins of the apparent "electrocatalytic" oxidation of kojic acid at graphene modified electrodes

Luiz C. S. Figueiredo-Filho, Dale A. C. Brownson, Orlando Fatibello-Filho and Craig E. Banks*

We explore the recent reports that the use of graphene modified electrodes gives rise to the electrocatalytic oxidation of kojic acid.



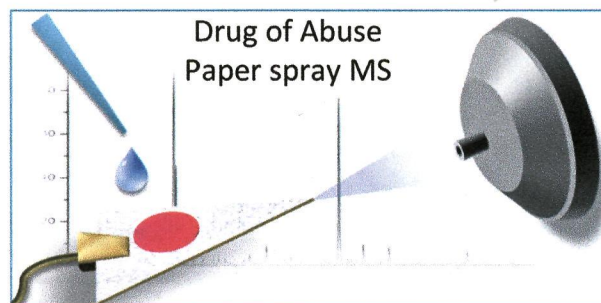
Федеральное государственное
бюджетное учреждение науки
Центральная научная библиотека
Уральского отделения
Российской академии наук (ЦНБ УрО РАН)

4443

Quantitative paper spray mass spectrometry analysis of drugs of abuse

Yuan Su, He Wang, Jiangjiang Liu, Pu Wei, R. Graham Cooks and Zheng Ouyang*

Direct and quantitative analysis of drugs of abuse in blood using paper spray mass spectrometry.

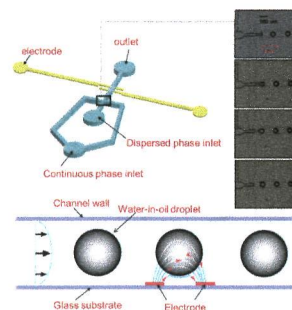


4448

An ac voltammetry approach for the detection of droplets in microfluidic devices

Yunfeng Gu and Adrian C. Fisher*

A simple electrochemical method using ac voltammetry to detect aqueous droplets up to 480 droplets per second in a flow-focusing microfluidic device is presented.



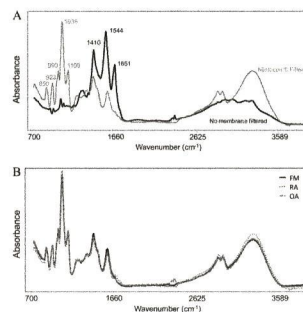
PAPERS

4453

A bloodspot-based diagnostic test for fibromyalgia syndrome and related disorders

Kevin V. Hackshaw, Luis Rodriguez-Saona, Marçal Plans, Lauren N. Bell and C. A. Tony Buffington*

The aim of this study was to investigate the ability of a rapid biomarker-based method for diagnosis of fibromyalgia syndrome (FM) using mid-infrared microspectroscopy (IRMS) to differentiate patients with FM from those with osteoarthritis (OA) and rheumatoid arthritis (RA), and to identify molecular species associated with the spectral patterns.

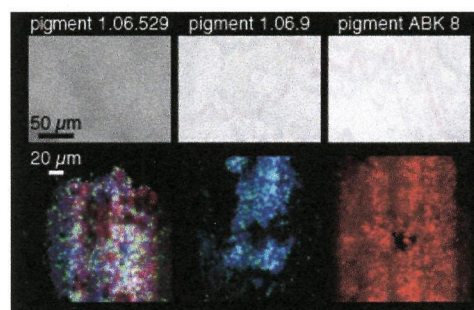


4463

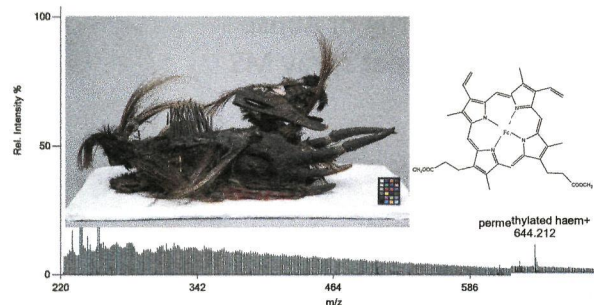
A multiscale photoluminescence approach to discriminate among semiconducting historical zinc white pigments

Loïc Bertrand,* Matthieu Réfrégiers, Barbara Berrie, Jean-Philippe Echard and Mathieu Thoury

In order to fully characterize the zinc white artists' semiconductor pigment (ZnO), much used since the mid-nineteenth century, three historical samples were studied using a combination of synchrotron and macroscopic photoluminescence spectroscopy and imaging to allow their differentiation.



4470

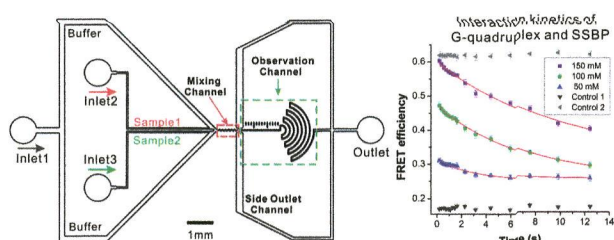


Characterization of blood in an encrustation on an African mask: spectroscopic and direct analysis in real time mass spectrometric identification of haem

Daniel Fraser,* Cathy Selvius DeRoo, Robert B. Cody and Ruth Ann Armitage

DART-TOF-MS with *in situ* derivatisation provides rapid confirmation of the presence of blood in a museum object.

4475

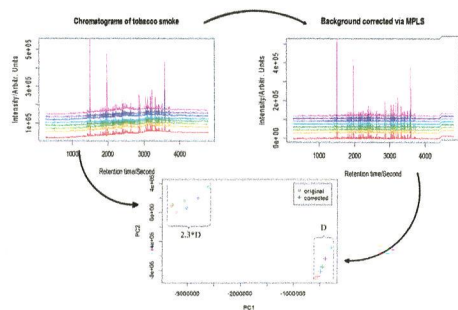


A novel microfluidic mixer based on dual-hydrodynamic focusing for interrogating the kinetics of DNA-protein interaction

Ying Li, Fei Xu, Chao Liu, Youzhi Xu, Xiaojun Feng and Bi-Feng Liu*

A novel dual-hydrodynamic focusing laminar mixer was used to interrogate the interaction kinetics between G-quadruplex and SSBP.

4483

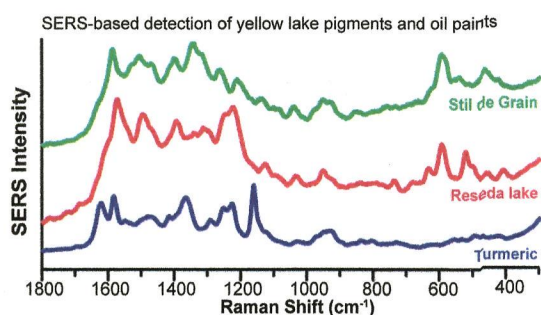


Morphological weighted penalized least squares for background correction

Zhong Li, De-Jian Zhan, Jia-Jun Wang, Jing Huang, Qing-Song Xu,* Zhi-Min Zhang, Yi-Bao Zheng, Yi-Zeng Liang* and Hong Wang

A novel algorithm named Morphological Weighted Penalized Least Squares (MPLS) is proposed for background correction in analytical chemistry. The method has been successfully applied to datasets from different instruments. The results show that the method is flexible and could handle different kinds of backgrounds.

4493



Surface-enhanced Raman spectroscopy studies of yellow organic dyestuffs and lake pigments in oil paint

Hannah E. Mayhew, David M. Fabian, Shelley A. Svoboda and Kristin L. Wustholz*

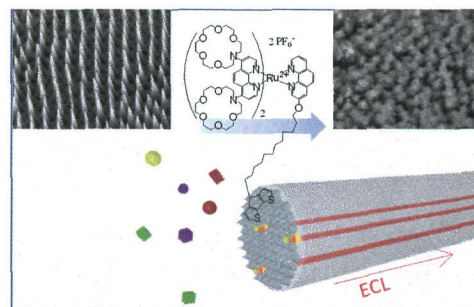
Development of a SERS-based approach for the detection of various yellow dyestuffs, lake pigments, and oil paints.

4500

Electrochemiluminescent polymer films with a suitable redox "turn-off" absorbance window for remote selective sensing of Hg^{2+}

Qinghai Shu, Catherine Adam, Neso Sojic* and Michael Schmittl*

Remote detection of Hg^{2+} using electrogenerated chemiluminescence *via* a nanostructured optical fiber bundle.

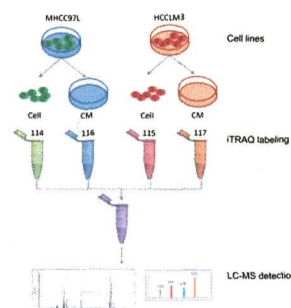


4505

An iTRAQ based quantitative proteomic strategy to explore novel secreted proteins in metastatic hepatocellular carcinoma cell lines

Yanyan Yu, Xiuwen Pan, Ying Ding, Xiaohui Liu, Hailin Tang, Chengpin Shen, Huali Shen* and Pengyuan Yang*

An iTRAQ based strategy for elimination of contaminating proteins from dead cells and accurate identification of secreted proteins.

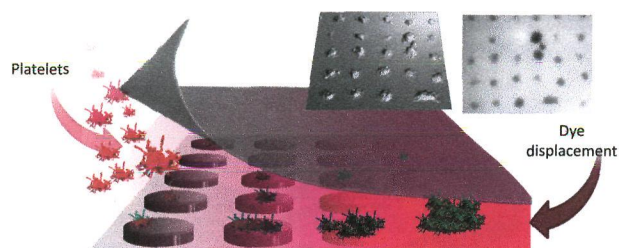


4512

A rapid, topographical platelet activation assay

R. Woolley,* Ú. Prendergast, B. Jose, D. Kenny and C. McDonagh

A novel platelet biochip coupled to a rapid, indirect fluorescent imaging chamber. Drug specific topographical changes are described using complimentary high resolution and rapid assay techniques to identify platelet activation.

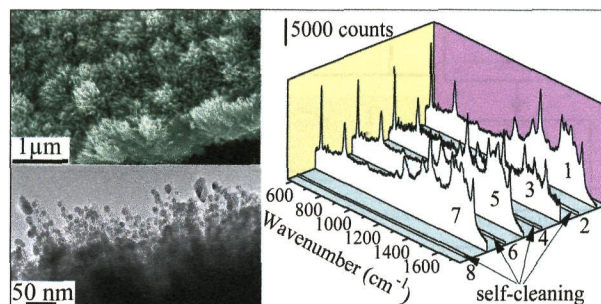


4519

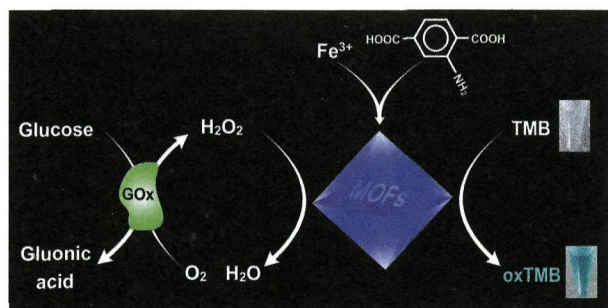
Ag-decorated TiO_2 nanograss for 3D SERS-active substrate with visible light self-cleaning and reactivation

S. C. Xu,* Y. X. Zhang, Y. Y. Luo, S. Wang, H. L. Ding, J. M. Xu and G. H. Li*

Large-area Ag-decorated TiO_2 nanograss SERS-active substrate which can be self-cleaned and reactivated by visible light irradiation without obvious degeneration of SERS signals.



4526

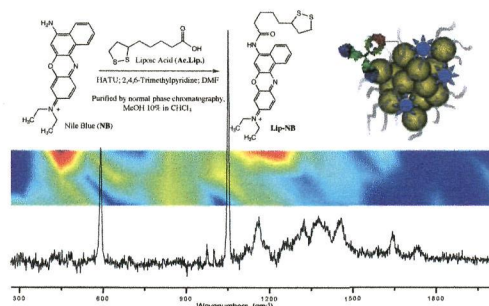


A nanosized metal–organic framework of Fe-MIL-88NH₂ as a novel peroxidase mimic used for colorimetric detection of glucose

Ya Li Liu, Xi Juan Zhao, Xiao Xi Yang and Yuan Fang Li*

A nanosized porous metal–organic framework containing iron(III), (Fe-MIL-88NH₂), was synthesized with a uniform octahedral structure by acetic acid addition, which at first functioned as an efficient peroxidase mimic, and was successfully used for simple, colorimetric determination of glucose.

4532

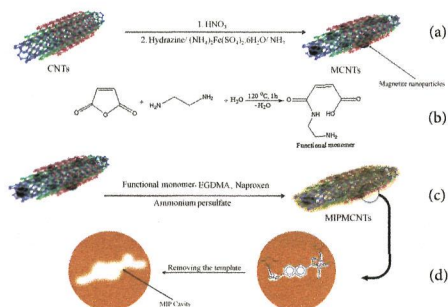


Alternative SERRS probes for the immunochemical localization of ovalbumin in paintings: an advanced mapping detection approach

Giorgia Sciutto, Lucio Litti, Cristiana Lofrumento, Silvia Prati, Marilena Ricci, Marina Gobbo, Aldo Roda, Emilio Castellucci, Moreno Meneghetti* and Rocco Mazzeo*

The immuno-SERRS procedure combines the selective localization of ovalbumin with the simultaneous Raman mapping of different paint components.

4542

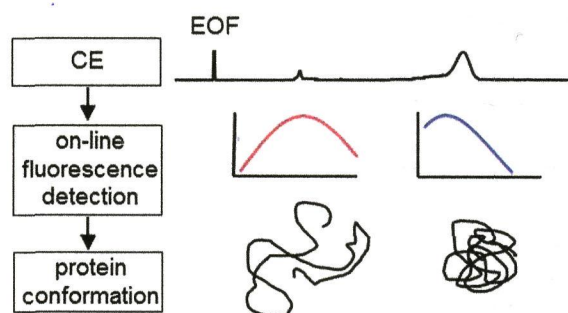


Selective solid-phase extraction of naproxen drug from human urine samples using molecularly imprinted polymer-coated magnetic multi-walled carbon nanotubes prior to its spectrofluorometric determination

Tayyebeh Madrakian,* Mazaher Ahmadi, Abbas Afkhami and Mohammad Soleimani

In this work, a molecularly imprinted polymer adsorbent is introduced as a solid phase for the selective extraction of naproxen (NAP) from human urine.

4550



Potential of capillary electrophoresis with wavelength-resolved fluorescence detection for protein unfolding studies using β -lactoglobulin B as a test compound

Bregje J. de Kort, Gerhardus J. de Jong and Govert W. Somsen*

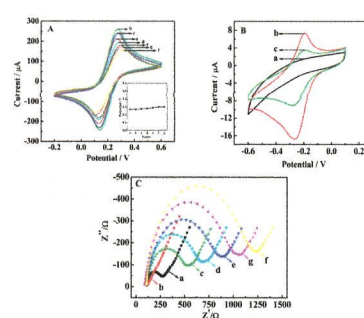
Capillary electrophoresis with wavelength-resolved fluorescence detection distinguishes protein conformational states and can provide information on protein unfolding pathways.

4558

A novel electrochemical aptasensor for thrombin detection based on the hybridization chain reaction with hemin/G-quadruplex DNAzyme-signal amplification

Juan Zhang, Yaqin Chai,* Ruo Yuan,* Yali Yuan, Lijuan Bai, Shunbi Xie and Liping Jiang

In this work, a novel signal amplification electrochemical aptasensor for the sensitive and selective detection of thrombin was successfully fabricated.

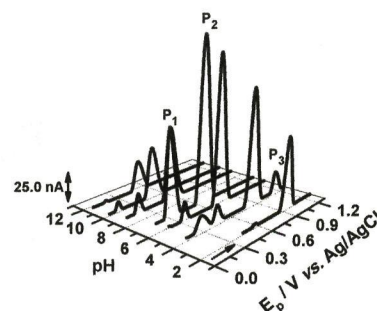


4565

Electrochemical study of ricin at glassy carbon electrode

Williame F. Ribeiro, Daniel J. E. da Costa, Anabel S. Lourenço, Ilanna C. Lopes, Everaldo P. de Medeiros, Giancarlo R. Salazar-Banda, Valberes B. do Nascimento and Mário C. U. de Araújo*

The electrochemical oxidation of RCA 60 at a GC electrode is quasi-reversible and pH-dependent. The first and second RCA 60 oxidation steps may correspond to the oxidation of cysteine and tyrosine-tryptophan residues, respectively.

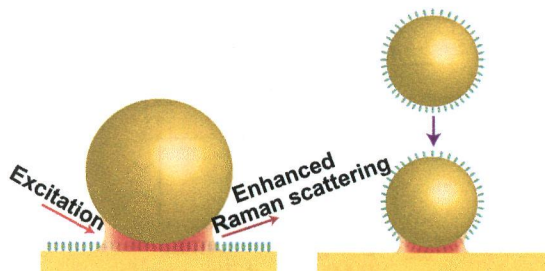


4574

Single molecule SERS and detection of biomolecules with a single gold nanoparticle on a mirror junction

Li Li, Tanya Hutter, Ullrich Steiner and Sumeet Mahajan*

A single gold nanoparticle on a mirror configuration is demonstrated to be able to detect single molecule SERS and biomolecules.

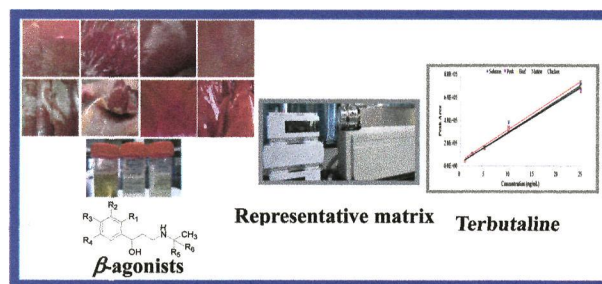


4579

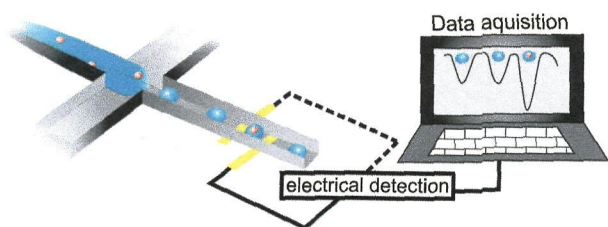
Selection of a representative matrix for the multiresidue analysis of nine β -agonists in animal tissues and urine with LC-MS/MS

LiQi Wang, LiMin He, Zhong Wang, XuFeng Wang, JianHua Shu, JianWen Yang, GaoKui Zhang and ZhenLing Zeng*

In the determination of nine β -agonists in porcine, bovine, lamb and chicken muscle, liver and urine samples with LC-MS/MS, calibration curves prepared in solvent (SC) were compared with those prepared in each matrix (MC) for all analytes.



4585

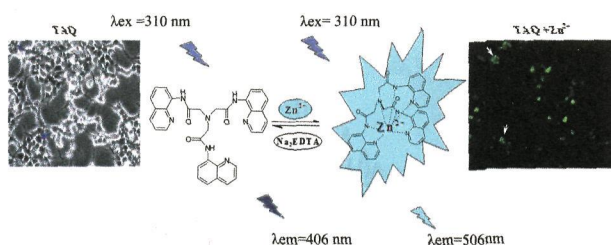


Label-free, high-throughput, electrical detection of cells in droplets

Evelien W. M. Kemna,* Loes I. Segerink, Floor Wolbers, István Vermes and Albert van den Berg

We present here a microfluidic chip for fast (>100 Hz) and label-free electrical impedance based detection of cells in droplets. Moreover, the all-electric approach provided by this microfluidic device allows for simple integration in Lab on a Chip (LOC) devices for single cell applications using droplet-based platforms.

4593

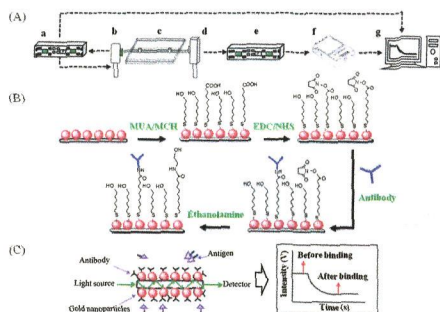


Ratiometric and absolute water-soluble fluorescent tripodal zinc sensor and its application in killing human lung cancer cells

Shyamaprosad Goswami,* Avijit Kumar Das, Krishnendu Aich, Abhishek Manna, Sibapasrad Maity, Kalyani Khanra and Nandan Bhattacharyya

A new "naked-eye" and ratiometric fluorescent zinc sensor (TAQ) of carboxamidoquinoline with 2-chloro-*N*-(quinol-8-yl)-acetamide as a receptor was designed and synthesized.

4599

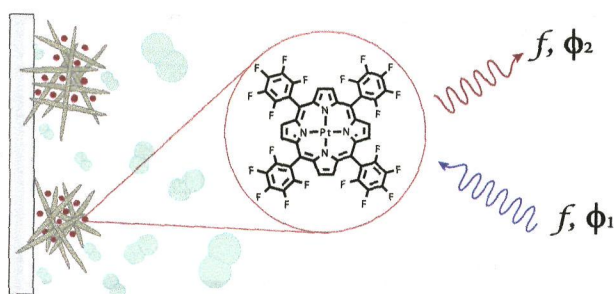


Quantification of tumor necrosis factor- α and matrix metalloproteinases-3 in synovial fluid by a fiber-optic particle plasmon resonance sensor

Yi-Ching Huang, Chang-Yue Chiang, Cheng-Hen Li, Ting-Chou Chang, Chung-Sheng Chiang, Lai-Kwan Chau,* Kuo-Wei Huang, Chin-Wei Wu, Shau-Chun Wang and Shaw-Ruey Lyu*

The availability of techniques for sensitive detection of early stage osteoarthritis is critical for improving patient health.

4607



High performance optical sensing nanocomposites for low and ultra-low oxygen concentrations using phase-shift measurements

Santiago Medina-Rodríguez,* Marta Marín-Suárez, Jorge Fernando Fernández-Sánchez,* Ángel de la Torre-Vega, Etienne Baranoff and Alberto Fernández-Gutiérrez

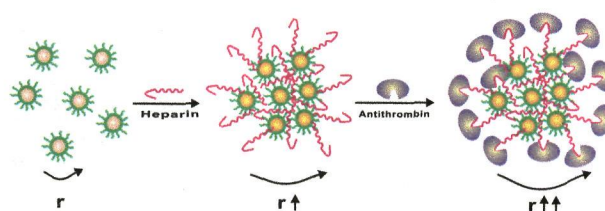
New optical sensing nanocomposites based on oxygen-sensitive dyes incorporated into a nanostructured metal oxide solid support resulted in an outstanding overall performance when combined with the phase-shift measurement method.

4618

Heparin-mediated fluorescence anisotropy assay of antithrombin based on polyethyleneimine capped Mn-doped ZnS quantum dots

Miao Shao and He-Fang Wang*

A homogeneous heparin-mediated fluorescence anisotropy assay of antithrombin based on long-lived luminescent polyethyleneimine capped Mn-doped ZnS QDs is presented.

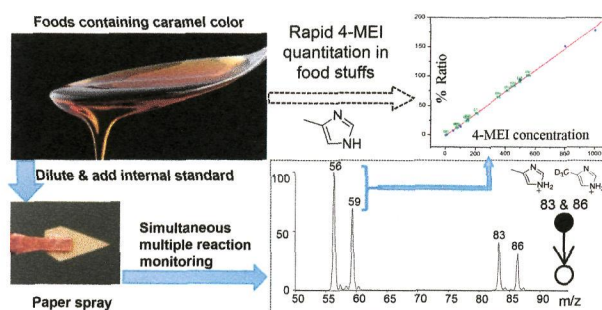


4624

Direct analysis of 4-methylimidazole in foods using paper spray mass spectrometry

Anyin Li, Pu Wei, Hsu-Chen Hsu and R. Graham Cooks*

Quantitation of methylimidazole in foods using multiple reaction monitoring over the ppb range.

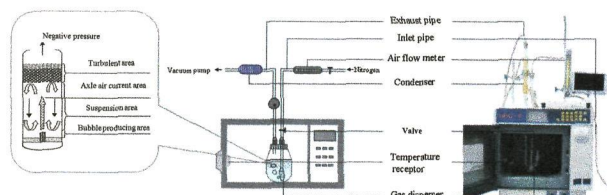


4631

An effective negative pressure cavitation-microwave assisted extraction for determination of phenolic compounds in *P. calliantha* H. Andr.

Dong-Yang Zhang, Xiao-Hui Yao, Ming-Hui Duan, Meng Luo, Wei Wang, Yu-Jie Fu,* Yuan-Gang Zu and Thomas Efferth

A novel negative pressure and microwave assisted extraction technique (NMAE) was first proposed and applied for extraction of phenolic compounds from pyrola.

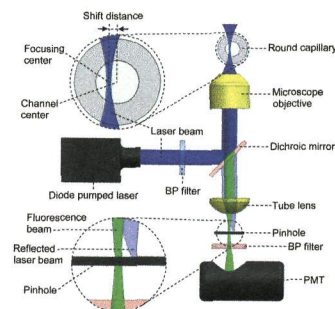


4642

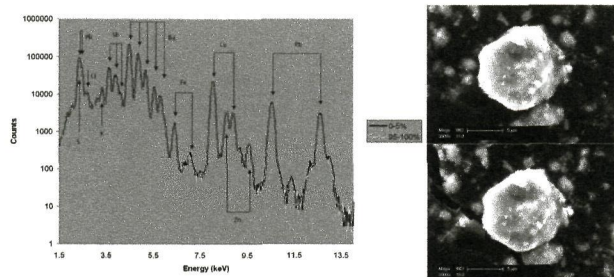
Improving the sensitivity of confocal laser induced fluorescence detection to the sub-picomolar scale for round capillaries by laterally shifting the laser focus point

Ying Zhu, Niannian Chen, Qi Li and Qun Fang*

We observed a novel optical phenomenon that fluorescence and reflected laser beams are spontaneously separated at the pinhole when the laser focus point deviates from the center of a round capillary, and built a highly sensitive confocal LIF detection system with a limit of detection of 66 fM.



4649

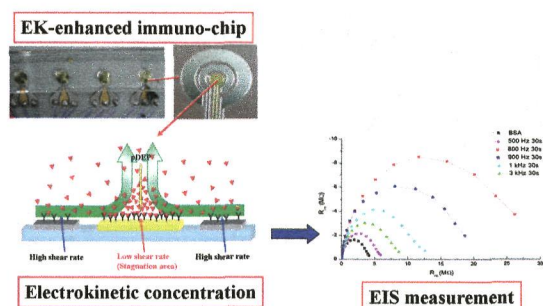


A new quantitative method for gunshot residue analysis by ion beam analysis

Matthew E. Christopher, John-William Warmenhoeven, Francesco S. Romolo, Matteo Donghi, Roger P. Webb, Christopher Jeynes, Neil I. Ward, Karen J. Kirkby and Melanie J. Bailey*

A new, faster method using a scanning proton microbeam is presented for the non-destructive, quantitative analysis of the elemental composition of single gunshot residue particles.

4656

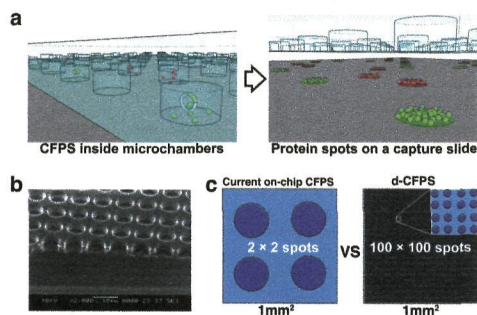


A rapid electrochemical biosensor based on an AC electrokinetics enhanced immuno-reaction

I-Fang Cheng, Hsiao-Lan Yang, Cheng-Che Chung and Hsien-Chang Chang*

A label-free, rapid and highly sensitive/specific immuno-chip that combines ACEO induced flow concentration, DEP attraction and EIS detection is proposed and demonstrated in this article.

4663

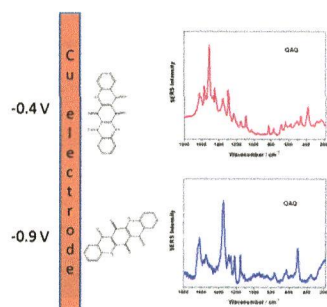


Ultra-high density protein spots achieved by on chip digitalized protein synthesis

Soo Hyeon Kim, Satoko Yoshizawa, Shoji Takeuchi, Teruo Fujii* and Dominique Fourmy*

Current methodologies for arraying proteins using cell-free protein synthesis on a chip have spatial limitations that prevent reaching ultra-high density necessary for high throughput analysis. The method presented here is the first step towards the miniaturization of protein chips for the generation of arrays with extremely high densities.

4670



Electrochemical SERS study on a copper electrode of the insoluble organic pigment quinacridone quinone using ionic liquids (BMIMCl and TBAN) as dispersing agents

Elena del Puerto,* Angel Cuesta, Santiago Sanchez-Cortes, Jose V. Garcia-Ramos and Concepcion Domingo*

Electrochemical SERS experiments of the insoluble pigment quinacridone quinone dispersed in ionic liquids (BMIMCl and TBAN) are reported.

4677

An overall uncertainty approach for the validation of analytical separation methods

T. Saffaj,* B. Ihssane, F. Jhilal, H. Bouchafra, S. Laslami and S. Alaoui Sosse

The aim of this paper is to recommend a new strategy for the analytical validation based on the uncertainty profile as a graphical decision-making tool, and to exemplify a novel method to estimate the measurement uncertainty.

