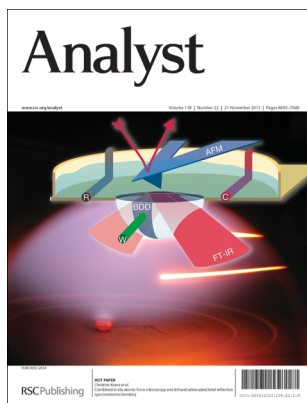


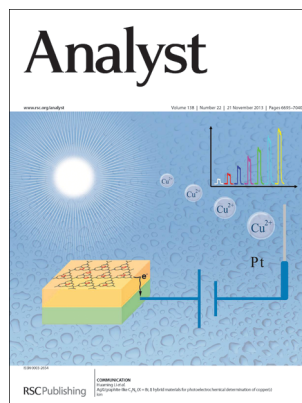
## IN THIS ISSUE

ISSN 0003-2654 CODEN ANALAO 138(22) 6695–7040 (2013)



### Cover

See Christine Kranz *et al.*, pp. 6746–6752.  
Image reproduced by permission of Christine Kranz from *Analyst*, 2013, **138**, 6746.



### Inside cover

See Huaming Li *et al.*, pp. 6721–6726.  
Image reproduced by permission of Huaming Li from *Analyst*, 2013, **138**, 6721.

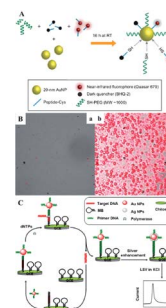
## MINIREVIEW

6709

### Nanoparticle-based signal generation and amplification in microfluidic devices for bioanalysis

Chong Hu, Wanqing Yue and Mengsu Yang\*

Signal generation and amplification based on nanomaterials and microfluidic techniques can be integrated to meet the demands for ultrasensitive and high-throughput detection of biomolecules. (Image reproduced with permission from (A) ref. 31, © 2010 ACS; (B) ref. 35, © 2011 ACS; (C) ref. 39, © 2013 Elsevier.)



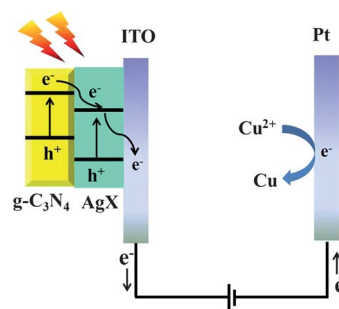
## COMMUNICATIONS

6721

### AgX/graphite-like C<sub>3</sub>N<sub>4</sub> (X = Br, I) hybrid materials for photoelectrochemical determination of copper(II) ion

Li Xu, Jiexiang Xia, Hui Xu, Jing Qian, Jia Yan, Leigang Wang, Kun Wang and Huaming Li\*

A photoelectrochemical strategy has been designed for the detection of Cu<sup>2+</sup> with AgX/g-C<sub>3</sub>N<sub>4</sub> (X = Br, I) materials. It can be applied to the detection of copper in human hair.



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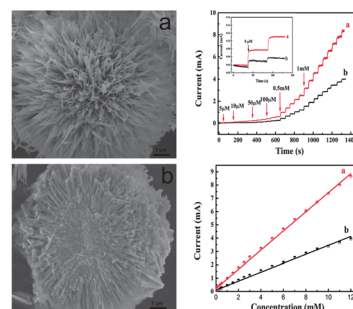
## COMMUNICATIONS

6727

**Co<sub>3</sub>O<sub>4</sub> microspheres with free-standing nanofibers for high performance non-enzymatic glucose sensor**

Chunyan Guo, Xuan Zhang, Huanhuan Huo, Cailing Xu\* and Xu Han

Co<sub>3</sub>O<sub>4</sub> microspheres with free-standing or bundled nanofibers (NFs) were fabricated for use as a platform for non-enzymatic glucose sensing.

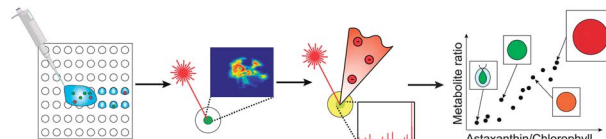


6732

**Analysis of single algal cells by combining mass spectrometry with Raman and fluorescence mapping**

Stephan R. Fagerer, Thomas Schmid, Alfredo J. Ibáñez, Martin Pabst, Robert Steinhoff, Konstantins Jefimovs, Pawel L. Urban and Renato Zenobi\*

In order to investigate metabolic properties of single cells of freshwater algae, we implemented a combination of MALDI mass spectrometry and microspectroscopic mapping.

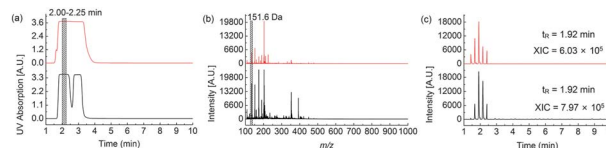


6737

**Hydrophilic interaction chromatography coupled matrix assisted laser desorption/ionization mass spectrometry for molecular analysis of organic compounds in medicines, tea, and coffee**

Ren-Qi Wang,\* Kai Bao, Jean-Philippe Croué and Siu Choon Ng\*

Improved characterization methods for natural occurring organic compounds from food, natural organic matter, and metabolic products are the focus of much current chemical and biological research.

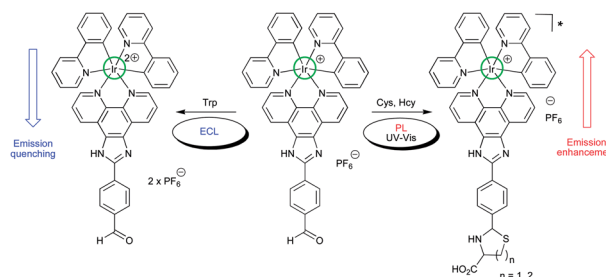


6742

**An iridium(III)-based lab-on-a-molecule for cysteine/homocysteine and tryptophan using triple-channel interrogation**

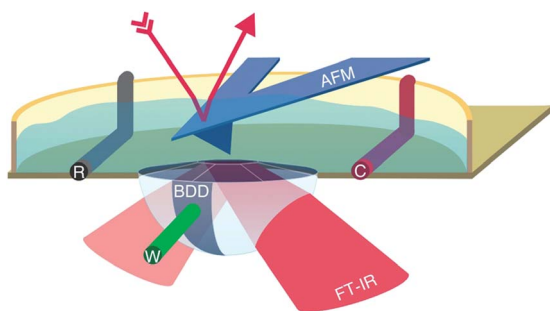
Kun Chen and Michael Schmittel\*

An iridium-aldehyde conjugate is the functional base of a lab-on-a-molecule for recognising and quantifying cysteine/homocysteine and tryptophan in a mixture of all proteinogenic amino acids.



## PAPERS

6746

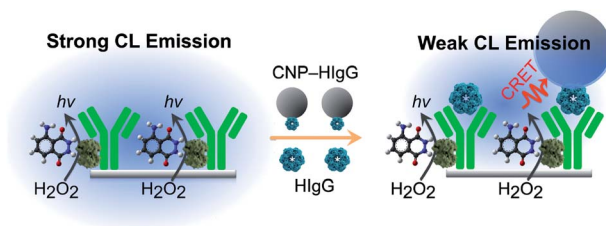


### Combined *in situ* atomic force microscopy and infrared attenuated total reflection spectroelectrochemistry

Daniel Neubauer, Jochen Scharpf, Alberto Pasquarelli, Boris Mizaikoff and Christine Kranz\*

Three major analytical techniques are integrated in a combined platform, allowing simultaneous *in situ* mid-IR spectroelectrochemical and topographical measurements.

6753

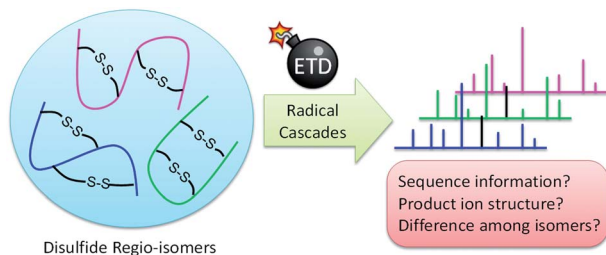


### Introducing novel amorphous carbon nanoparticles as energy acceptors into a chemiluminescence resonance energy transfer immunoassay system

Zhenxing Wang, Hongfei Gao and Zhifeng Fu\*

Novel amorphous carbon nanoparticles were introduced into a chemiluminescence resonance energy transfer immunoassay system as energy acceptors.

6759

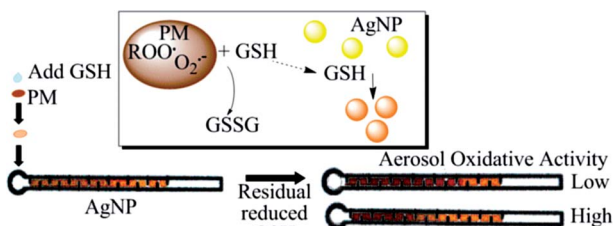


### Radical cascades in electron transfer dissociation (ETD) – implications for characterizing peptide disulfide regio-isomers

Lei Tan, Kirt L. Durand, Xiaoxiao Ma and Yu Xia\*

Radical cascades in ETD cause multiple disulfide bond cleavages which are useful in providing rich sequence information.

6766



### Determination of aerosol oxidative activity using silver nanoparticle aggregation on paper-based analytical devices

Wijitar Dungchai, Yupaporn Sameenoi, Orawon Chailapakul, John Volckens and Charles S. Henry\*

Airborne particulate matter (PM) pollution significantly impacts human health, but the cellular mechanisms of PM-induced toxicity remain poorly understood.

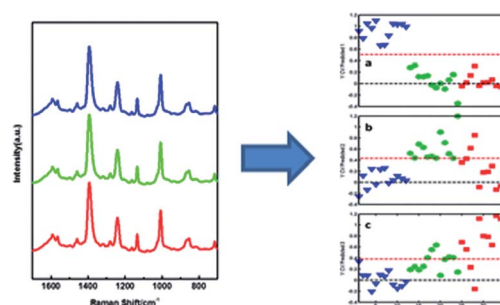
## PAPERS

6774

### Identification of mycobacteria based on spectroscopic analyses of mycolic acid profiles

Omar E. Rivera-Betancourt, Russell Karls, Benjamin Grosse-Siestrup, Shelly Helms, Frederick Quinn and Richard A. Dluhy\*

This report examines lipophilic extracts containing mycolic acids isolated from tuberculosis (MTB) and non-tuberculosis (NTM) mycobacterial strains using chromatography, mass spectrometry (MS), nuclear magnetic resonance (NMR), and Raman spectroscopy.

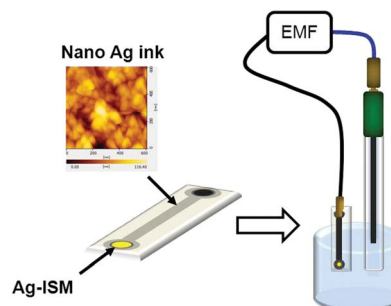


6786

### Development of coated-wire silver ion selective electrodes on paper using conductive films of silver nanoparticles

Wanwisa Janrungroatsakul, Chutiparn Lertvachirapaiboon, Wittaya Ngeontae, Wanlapa Aeungmaitrepirom, Orawon Chailapakul, Sanong Ekgasit and Thawatchai Tuntulani\*

Films of silver nanoparticles are used for the first time as electrical conductor and ion-to-electron transducer to fabricate coated-wire ion selective electrodes on paper.

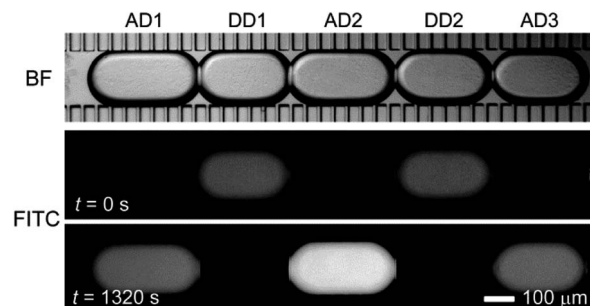


6793

### Microfluidic passive permeability assay using nanoliter droplet interface lipid bilayers

Takasi Nisisako,\* Shiva A. Portonovo and Jacob J. Schmidt\*

We present a microfluidic platform for a passive membrane permeability assay using artificial planar lipid bilayers formed between nanoliter sized droplets.

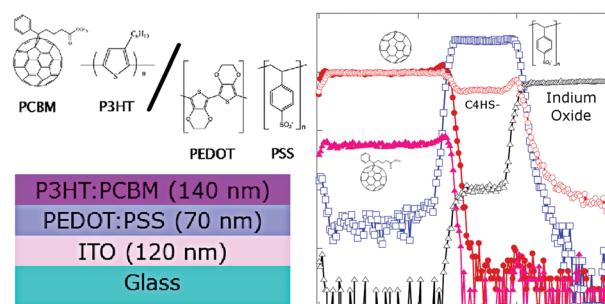


6801

### Molecular depth profiling of organic photovoltaic heterojunction layers by ToF-SIMS: comparative evaluation of three sputtering beams

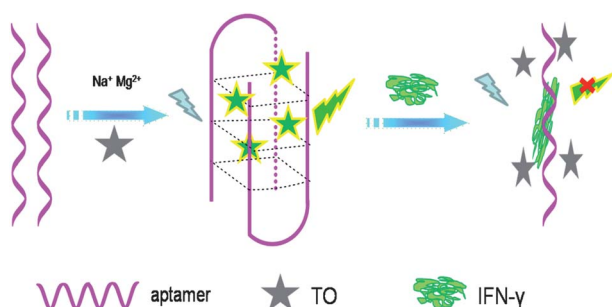
T. Mouhib, C. Poleunis, N. Wehbe, J. J. Michels, Y. Galagan, L. Houssiau, P. Bertrand and A. Delcorte\*

With the development of Ar supercluster beams in secondary ion mass spectrometry (SIMS), it is now possible to obtain organic depth profiles where the molecular information of the mass spectrum is retained through the sputtering of the sample.





6811

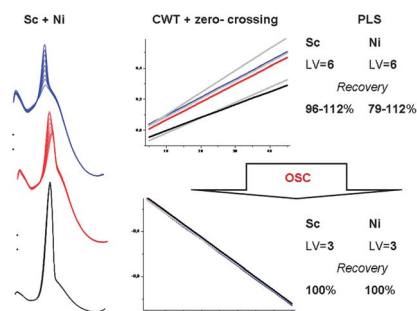


### Label-free fluorescence probe based on structure-switching aptamer for the detection of interferon gamma

Li Pan, Yong Huang, Changchun Wen and Shulin Zhao\*

A novel label-free fluorescence probe based on structure-switching aptamer was developed for the detection of interferon-gamma.

6817

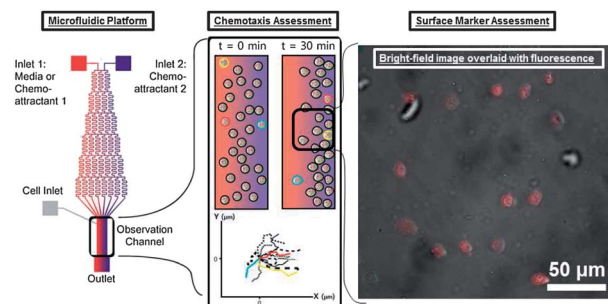


### Deviations from bilinearity in multivariate voltammetric calibration models

Małgorzata Jakubowska,\* Łukasz Górski and Robert Piech

This work considers the problem of lack of bilinearity in multivariate calibration. We demonstrate that orthogonal correction enables the removal of almost all non-linear effects, disturbing voltammetric signals that impede the building of effective PLS models.

6826

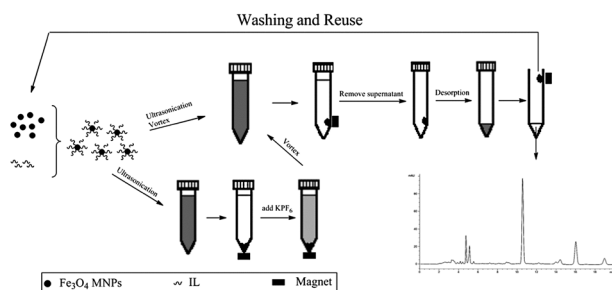


### The role of p38 MAPK in neutrophil functions: single cell chemotaxis and surface marker expression

Donghyuk Kim and Christy L. Haynes\*

On-chip chemotaxis and surface marker assessment in individual human neutrophils

6834



### Dispersive micro-solid phase extraction based on self-assembling, ionic liquid-coated magnetic particles for the determination of clofentezine and chlorfenapyr in environmental water samples

Bing Peng, Jiaheng Zhang, Runhua Lu, Sanbing Zhang, Wenfeng Zhou and Haixiang Gao\*

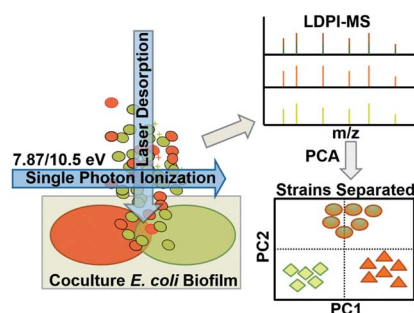
Two IL-Fe<sub>3</sub>O<sub>4</sub> MPs were developed for use in two types of D- $\mu$ -SPE for the determination by HPLC of clofentezine and chlorfenapyr in environmental water.

6844

### Differentiation of microbial species and strains in coculture biofilms by multivariate analysis of laser desorption postionization mass spectra

Chhavi Bhardwaj, Yang Cui, Theresa Hofstetter, Suet Yi Liu, Hans C. Bernstein, Ross P. Carlson, Musahid Ahmed and Luke Hanley\*

Principle component analysis of laser desorption postionization mass spectra distinguishes genetically similar strains of microbes within intact coculture bacterial biofilms.

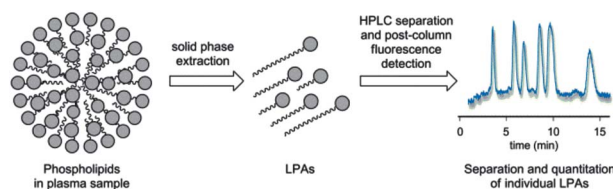


6852

### Simple enrichment and analysis of plasma lysophosphatidic acids

Jialu Wang, Martha Sibrian-Vazquez, Jorge O. Escobedo, Mark Lowry, Lei Wang, Yu-Hsuan Chu, Richard G. Moore and Robert M. Strongin\*

An improved extraction of lysophosphatidic acids (LPAs) from plasma allows LC-MS and post-column fluorescence detection with comparable results. Chromatographic separation of individual LPAs is achieved in 15 minutes.

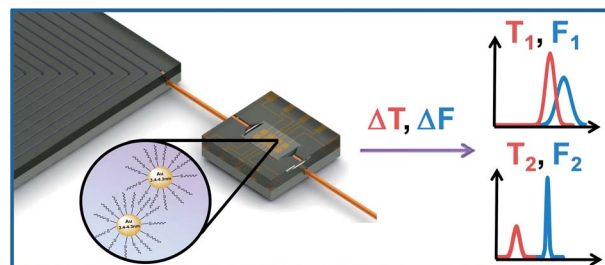


6860

### A nanoparticle-coated chemiresistor array as a microscale gas chromatograph detector for explosive marker compounds: flow rate and temperature effects

L. K. Wright and E. T. Zellers\*

Stability, sensitivity, detectability, and chromatographic resolution are assessed and optimal conditions are established for high-speed  $\mu$ GC analysis of selected markers of TNT.

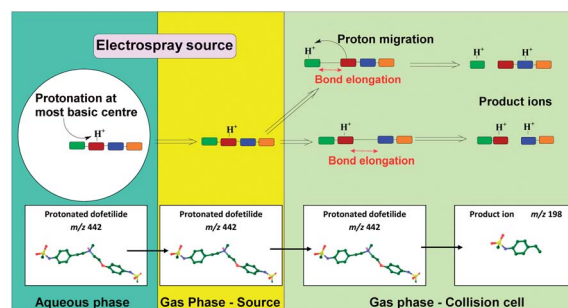


6869

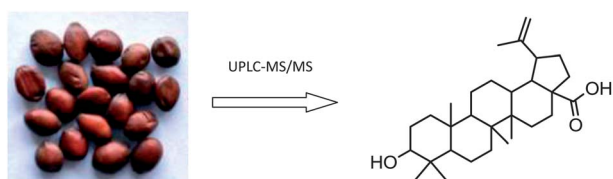
### Understanding collision-induced dissociation of dofetilide: a case study in the application of density functional theory as an aid to mass spectral interpretation

Patricia Wright,\* Alexander Alex, Sophie Harvey, Teresa Parsons and Frank Pullen

Protonation-induced bond lengthening, calculated using quantum chemistry software, is potentially a descriptor for predicting which bonds will break during collision-induced dissociation, aiding mass spectral assignment.



6881

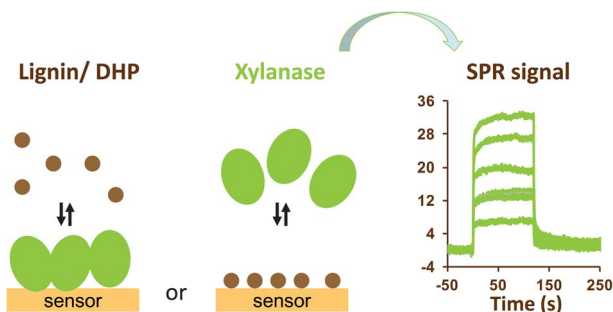


**Phytochemical analyses of *Ziziphus jujuba* Mill. var. *spinosa* seed by ultrahigh performance liquid chromatography-tandem mass spectrometry and gas chromatography-mass spectrometry**

Bao Yang, Hongshun Yang, Feng Chen, Yanglin Hua and Yueming Jiang\*

*Ziziphus jujuba* Mill. var. *spinosa* (*Z. jujuba*) seeds have received much attention from the medical community due to their beneficial effects against disturbances of the central nervous system.

6889

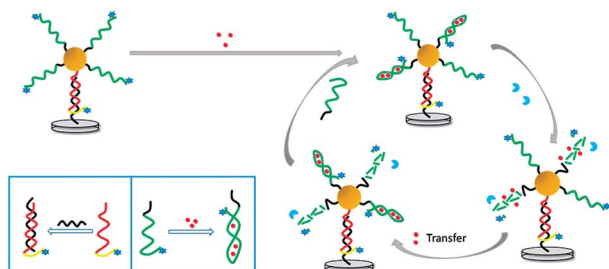


**Novel surface-based methodologies for investigating GH11 xylanase–lignin derivative interactions**

G. Zeder-Lutz, S. Renau-Ferrer, V. Aguié-Béghin, H. Rakotoarivonina, B. Chabbert, D. Altschuh and C. Rémond\*

The recalcitrance of lignocellulose to bioprocessing represents the core problem and remains the limiting factor in creating an economy based on lignocellulosic ethanol production.

6900

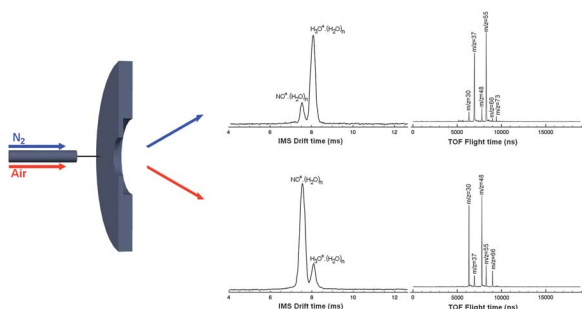


**An ultrasensitive electrochemical method for detection of  $\text{Ag}^+$  based on cyclic amplification of exonuclease III activity on cytosine– $\text{Ag}^+$ –cytosine**

Gang Xu, Guangfeng Wang,\* Xiuping He, Yanhong Zhu, Ling Chen and Xiaojun Zhang\*

An ultrasensitive electrochemical method for  $\text{Ag}^+$  detection based on AuNPs and conformation-dependent Exo III activity is reported.

6907



**A corona discharge atmospheric pressure chemical ionization source with selective  $\text{NO}^+$  formation and its application for monoaromatic VOC detection**

Martin Sabo and Štefan Matejčík\*

We have developed a new type of corona discharge (CD) for atmospheric pressure chemical ionization (APCI) for application in ion mobility spectrometry (IMS) as well as in mass spectrometry (MS).



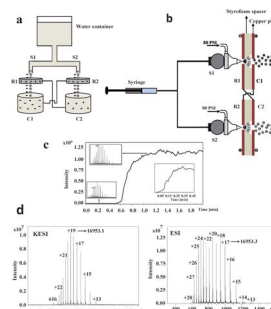
## PAPERS

6913

**Kelvin spray ionization**

Abdil Özdemir, Jung-Lee Lin, Kent J. Gillig and Chung-Hsuan Chen\*

A novel self-powered dual spray ionization source has been developed for applications in mass spectrometry.

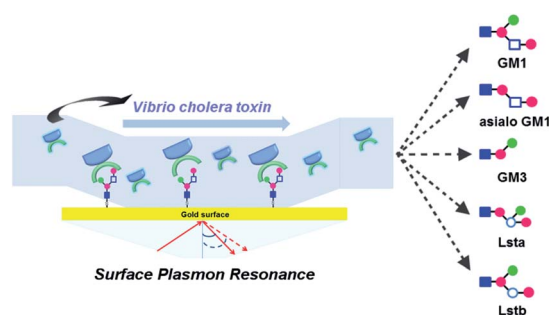


6924

**Structural evaluation of GM1-related carbohydrate-cholera toxin interactions through surface plasmon resonance kinetic analysis**

Jeong Hyun Seo, Chang Sup Kim and Hyung Joon Cha\*

Direct immobilization of carbohydrate in an SPR-based analytical system was used to evaluate the structural contribution of carbohydrate moieties in carbohydrate-protein interactions, particularly GM1-related carbohydrate-*Vibrio cholera* toxin interactions.

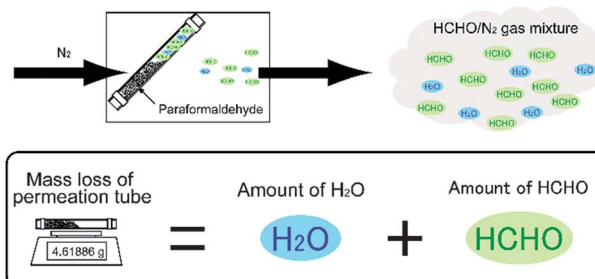


6930

**Evaluation of the permeability of formaldehyde and water through a permeation tube for the preparation of an accurate formaldehyde reference gas mixture**

Nobuyuki Aoki,\* Kenji Kato, Reiji Aoyagi and Masahiko Wakayama

A system for continuous generation and analysis of formaldehyde (HCHO) in a nitrogen gas mixture prepared using a permeation method was fabricated to evaluate the permeability of HCHO and water through a permeation tube.

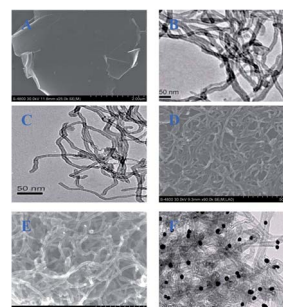


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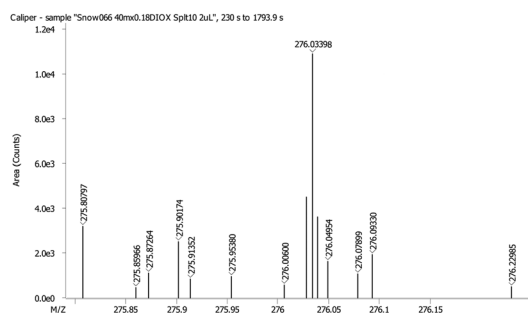
**A highly sensitive electrochemical aptasensor for thrombin detection using functionalized mesoporous silica@multiwalled carbon nanotubes as signal tags and DNazyme signal amplification**

Juan Zhang, Yaqin Chai,\* Ruoyuan,\* Yali Yuan, Lijuan Bai and Shunbi Xie

In this work, we demonstrated a novel sensitive sandwich-type pseudobienzyme aptasensor for thrombin detection.



6946

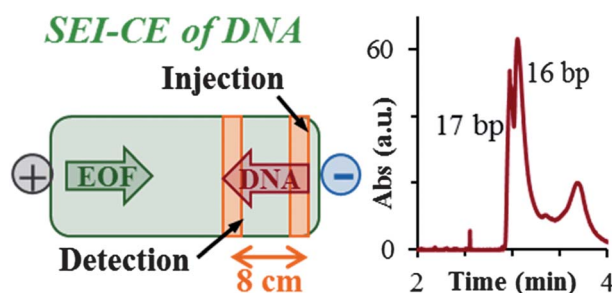


### The benefits of high resolution mass spectrometry in environmental analysis

Albert T. Lebedev,<sup>\*</sup> Olga V. Polyakova, Dmitry M. Mazur and Viatcheslav B. Artaev

Demonstration of the advantages of high resolution GC/MS for qualitative and quantitative environmental analyses including targeted and non-targeted approaches.

6954

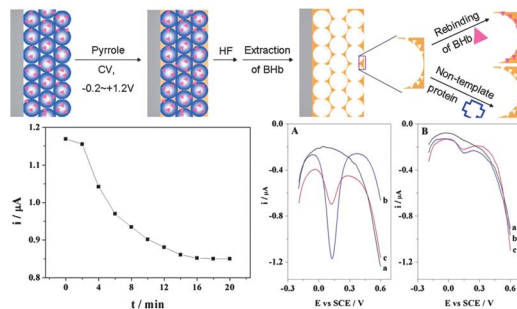


### Rapid separation of synthetic oligonucleotides on polymer modified capillary surfaces using short-end injection capillary electrophoresis in free solution

Kerrilee E. Allan, Claire E. Lenahan, Dmitriy A. Khodakov and Amanda V. Ellis<sup>\*</sup>

The use of short-end injection for CE analysis of oligonucleotides reduces the migration time by up to 700% in comparison to ordinary injection.

6962

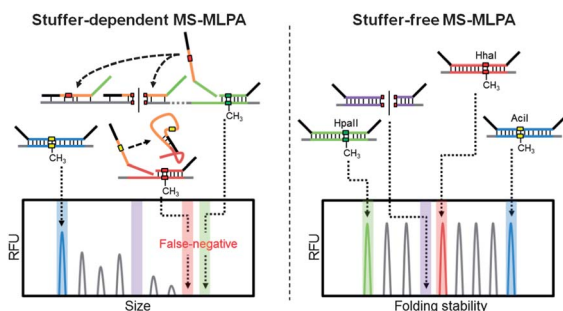


### Surface molecularly imprinted polymers-based electrochemical sensor for bovine hemoglobin recognition

Lu Li, Lingling Yang, Zonglan Xing, Xiaojing Lu and Xianwen Kan<sup>\*</sup>

Surface molecularly imprinted and assembly techniques were combined to prepare a novel macroporous MIPs based electrochemical sensor for the recognition and detection of bovine hemoglobin.

6969



### A robust and simple-to-design multiplex DNA methylation assay based on MS-MLPA-CE-SSCP

Jeongkyeong Na, Gi Won Shin, Gyu Yong Jung and Gyoo Yeol Jung<sup>\*</sup>

We demonstrate a robust and simple method for the quantification of DNA methylation by using stuffer-free methylation-specific multiplex ligation-dependent probe amplification and high resolution conformation-sensitive separation.

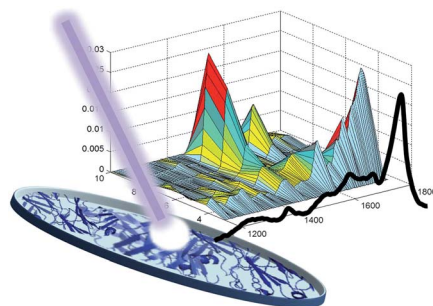
## PAPERS

6977

### The challenge of applying Raman spectroscopy to monitor recombinant antibody production

Lorna Ashton, Yun Xu, Victoria L. Brewster, David P. Cowcher, Christopher A. Sellick, Alan J. Dickson, Gill M. Stephens and Royston Goodacre\*

UV resonance Raman spectroscopy combined with chemometric methods can be used to monitor secreted recombinant antibody production in cultures of Chinese hamster ovary (CHO) cells.

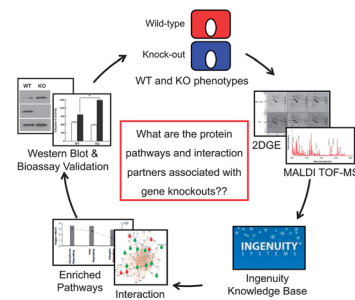


6986

### Differential proteomic analysis of caveolin-1 KO cells reveals Sh2b3 and Clec12b as novel interaction partners of caveolin-1 and Capns1 as a potential mediator of caveolin-1-induced apoptosis

Yogesh M. Kulkarni, Changxing Liu, Qi Qi, Yanmei Zhu, David J. Klinker II\* and Jun Liu\*

Caveolin-1 (Cav1) is a small scaffolding protein involved in a variety of cellular functions, including cell signaling, lipid transport and membrane traffic.

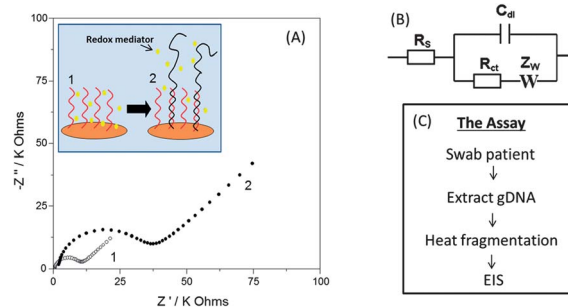


6997

### Development of a PCR-free electrochemical point of care test for clinical detection of methicillin resistant *Staphylococcus aureus* (MRSA)

D. K. Corrigan, H. Schulze, G. Henihan, A. Hardie, I. Ciani, G. Giraud, J. G. Terry, A. J. Walton, R. Pethig, P. Ghazal, J. Crain, C. J. Campbell, K. E. Templeton, A. R. Mount and T. T. Bachmann\*

An MRSA assay requiring neither labeling nor amplification of target DNA has been developed.

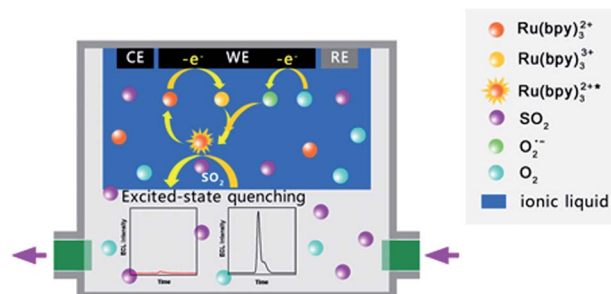


7006

### An ionic liquid-mediated electrochemiluminescent sensor for the detection of sulfur dioxide at the ppb level

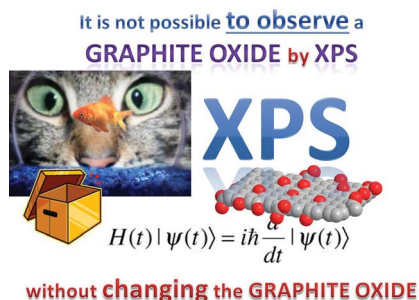
Lichan Chen, Yuanjin Zhang, Shuyan Ren, Danjun Huang, Chen Zhou, Yuwu Chi\* and Guonan Chen

A sensitive and portable  $\text{SO}_2$  gas sensor was constructed based on the  $\text{SO}_2$  quenching effect on ionic liquid-mediated  $\text{Ru}(\text{bpy})_3^{2+}/\text{O}_2$  electrochemiluminescence.



## PAPERS

7012

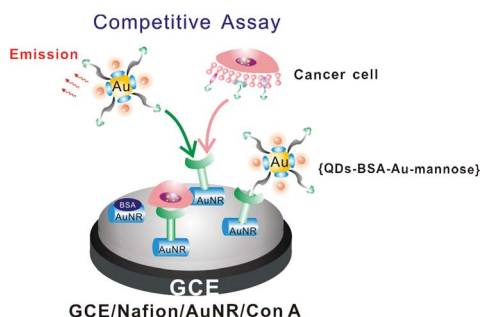


### Prolonged exposure of graphite oxide to soft X-ray irradiation during XPS measurements leads to alterations of the chemical composition

Chun Kiang Chua, Adriano Ambrosi and Martin Pumera\*

It is not possible to observe a graphite oxide by XPS without changing the graphite oxide.

7016

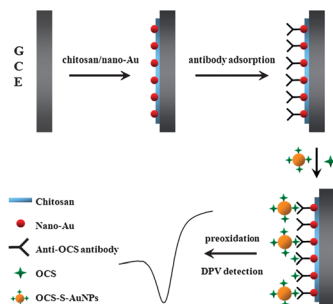


### Fluorescence assay for glycan expression on living cancer cells based on competitive strategy coupled with dual-functionalized nanobiocomposites

Ying Fu, Danqin Lu, Bin Lin, Qianqian Sun, Kai Liu, Lili Xu, Shengping Zhang, Chen Hu, Chuangui Wang, Zhiai Xu\* and Wen Zhang\*

Cell surface glycans are a class of sophisticated biomolecules. We propose a fluorescence assay to evaluate glycan expression on living cancer cells based on dual-functionalized nanobiocomposites.

7023



### An octachlorostyrene electrochemical immunosensor: double amplification strategies with immobilization of nano-Au and Au nanoparticle labels

Jiezhen Li, Lan Chen, Chen'an Huang, Liping Zhou, Lijuan Yuan, Lei Shi, Dan Li and Qingyun Cai\*

This work developed a high selectivity immunosensor for detecting OCS using double amplification strategies by labeling nano-Au and Au nanoparticles.

7031



### A potentiometric tattoo sensor for monitoring ammonium in sweat

Tomàs Guinovart, Amay J. Bandodkar, Joshua R. Windmiller, Francisco J. Andrade\* and Joseph Wang\*

A solid-contact ion-selective electrode in the form of an epidermal temporary tattoo for monitoring ammonium in sweat is presented.