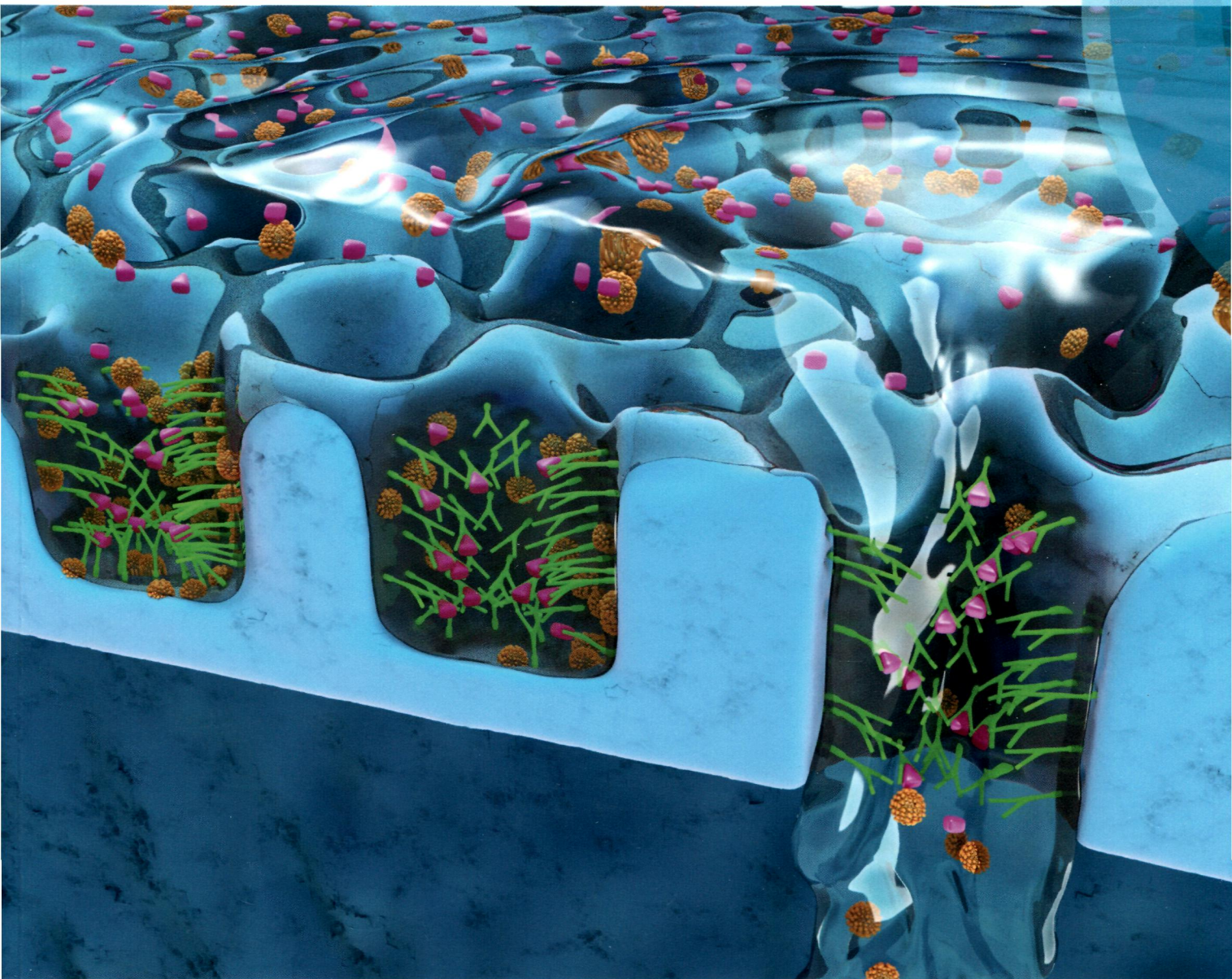
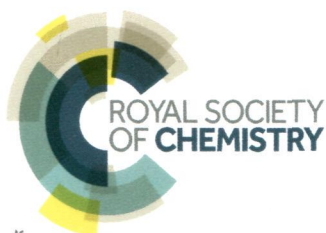


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ROYAL SOCIETY
OF CHEMISTRY

HOT ARTICLE

Paolo Bettotti *et al.*

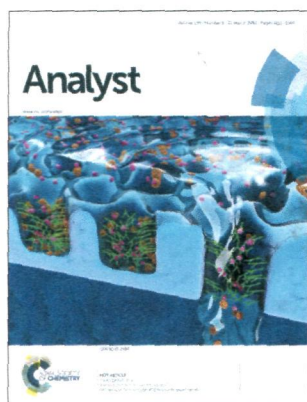
Investigation of non-specific signals in
nanoporous flow-through and flow-over based sensors

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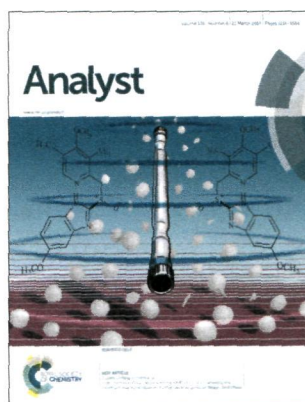
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IN THIS ISSUE

ISSN 0003-2654 CODEN ANALAO 139(6) 1211–1564 (2014)



Cover
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See Juliana Cristina Barreiro
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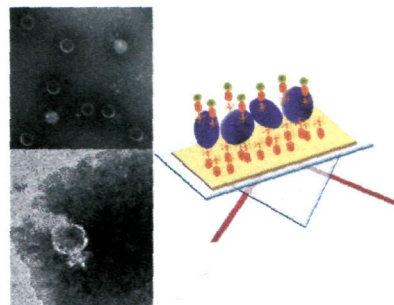
MINIREVIEW

1224

Bacteriophages: biosensing tools for multi-drug resistant pathogens

N. Tawil,* E. Sacher, R. Mandeville and M. Meunier

Bacteriophages are effective biosensing elements for the detection of antibiotic-resistant pathogenic bacteria.



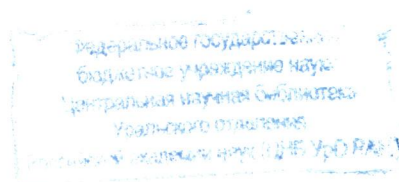
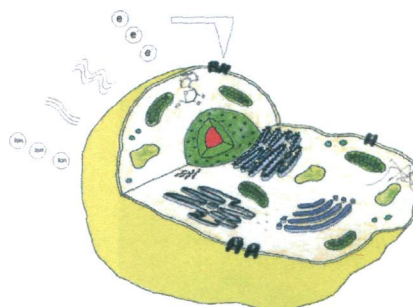
CRITICAL REVIEWS

1237

Making a big thing of a small cell – recent advances in single cell analysis

Kerstin Galler, Katharina Bräutigam, Christina Große, Jürgen Popp and Ute Neugebauer

All aspects of the characterisation of single cells are reviewed: from morphology to genetics and different omics-techniques to physiological, mechanical and electrical methods, including microfluidics and applications.

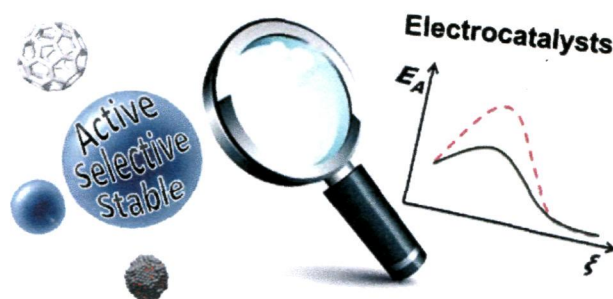


1274

Techniques and methodologies in modern electrocatalysis: evaluation of activity, selectivity and stability of catalytic materials

Aliksandr S. Bandarenka, Edgar Ventosa, Artjom Maljusch, Justus Masa and Wolfgang Schuhmann*

The development and optimisation of materials that promote electrochemical reactions have recently attracted attention mainly due to the challenge of sustainable provision of renewable energy in the future.

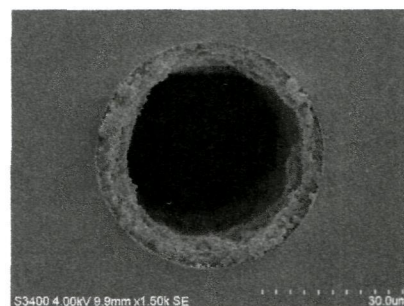


1292

Porous layer open tubular columns in capillary liquid chromatography

David A. Collins, Ekaterina P. Nesterenko* and Brett Paull

This review covers the latest advances of porous layer open tubular columns in capillary liquid chromatography.

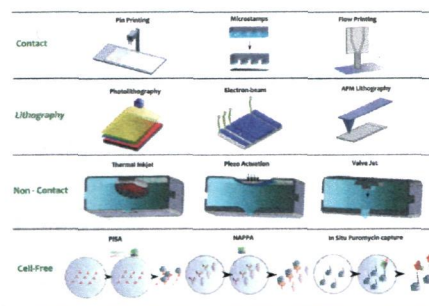


1303

A critical comparison of protein microarray fabrication technologies

Valentin Romanov, S. Nikki Davidoff, Adam R. Miles, David W. Grainger, Bruce K. Gale and Benjamin D. Brooks*

Of the diverse analytical tools used in proteomics, protein microarrays possess the greatest potential for providing fundamental information on protein, ligand, analyte, receptor, and antibody affinity-based interactions, binding partners and high-throughput analysis.



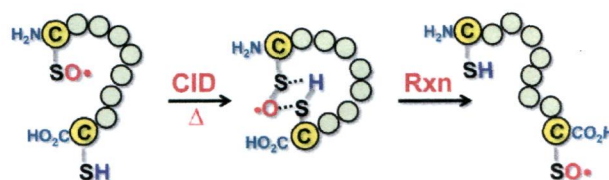
COMMUNICATIONS

1327

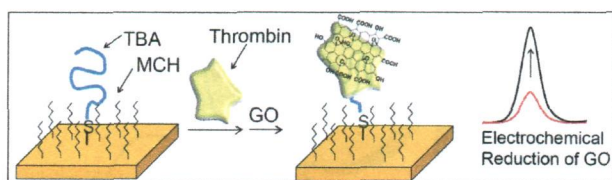
Intra-molecular reactions as a new approach to investigate bio-radical reactivity: a case study of cysteine sulfinyl radicals

Kirt L. Durand, Xiaoxiao Ma and Yu Xia*

Utilizing gas-phase intra-molecular reactions facilitated by energetic collisions, a new reaction channel, sulfinyl radical exchange with thiol within a polypeptide, was observed for the first time.



1331

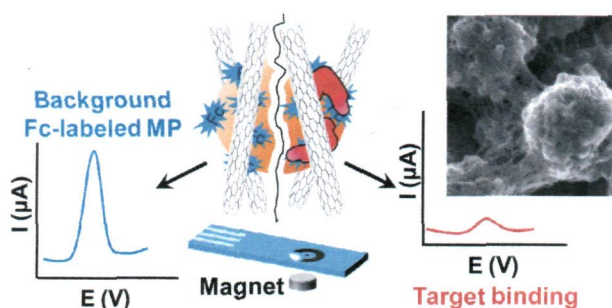


Electrochemical thrombin detection based on the direct interaction of target proteins and graphene oxide as an indicator

Dongcheol Choi, Hanall Jeong and Kyuwon Kim*

Target protein-directed adsorption of graphene oxide (GO) as an electroactive indicator was employed for electrochemical detection of thrombin.

1334

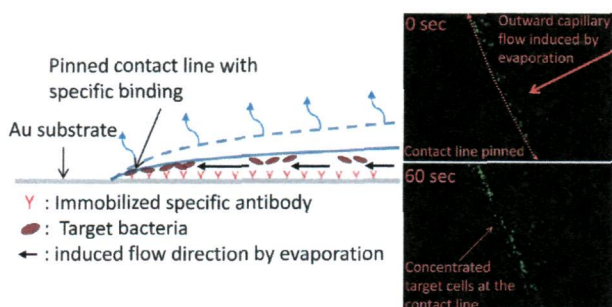


Electrochemical biosensing of non-electroactive targets using ferrocene-labeled magnetic particles and CNT wiring

Zorione Herrasti, Rosa Olivé-Monllau, Francesc Xavier Muñoz-Pascual, Fernando Martínez and Eva Baldrich*

Target binding onto ferrocene-modified magnetic microparticles promotes physical sheltering of the labels, which can be measured electrochemically by CNT wiring.

1340



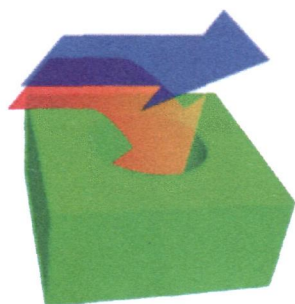
Contact angle changes induced by immunocomplex formation

Jong-Hoon Kim, Amy Q. Shen, Kyong-Hoon Lee, Gerard A. Cangelosi and Jae-Hyun Chung*

This paper studies contact-angle changes of bacterial suspensions on antibody immobilized surfaces.

PAPERS

1345



Investigation of non-specific signals in nanoporous flow-through and flow-over based sensors

Neeraj Kumar, Elena Froner, Romain Guider, Marina Scarpa and Paolo Bettotti*

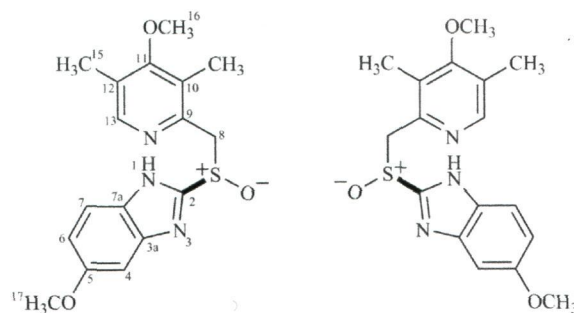
We compared flow through vs. flow over assays using nanoporous materials and we underline the advantages of the former approach in terms of reduction of the non-specific signal.

1350

High resolution magic angle spinning NMR as a tool for unveiling the molecular enantio-recognition of omeprazole by amylose-based chiral phase

Juliana Cristina Barreiro,* Tiago de Campos Lourenço, Lorena Mara A. Silva, Tiago Venâncio and Quezia Bezerra Cass

This work reports key information about the enantio-recognition of omeprazole at the binding sites of the polysaccharide-based chiral stationary phase.

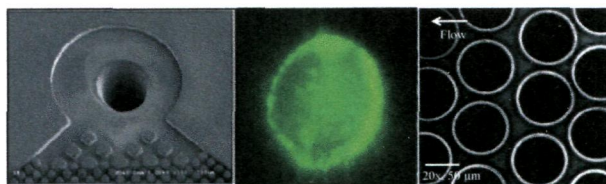


1355

Solid-phase extraction and purification of membrane proteins using a UV-modified PMMA microfluidic bioaffinity μ SPE device

Katrina N. Battle, Joshua M. Jackson, Małgorzata A. Witek, Mateusz L. Hupert, Sally A. Hunsucker, Paul M. Armistead and Steven A. Soper*

We present a novel microfluidic solid-phase extraction (μ SPE) device for the affinity enrichment of biotinylated membrane proteins from whole cell lysates.

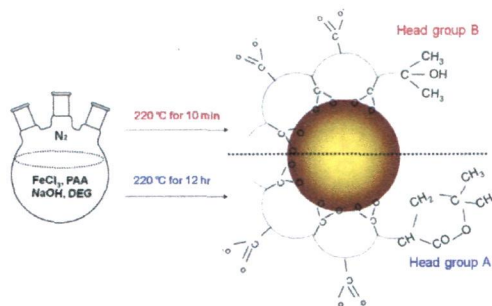


1364

Protein binding for detection of small changes on a nanoparticle surface

Shang Zeng, Yu-ming M. Huang, Chia-en A. Chang* and Wenwan Zhong*

Protein adsorption is sensitive enough to detect structural changes in the head group of the polymeric ligand.

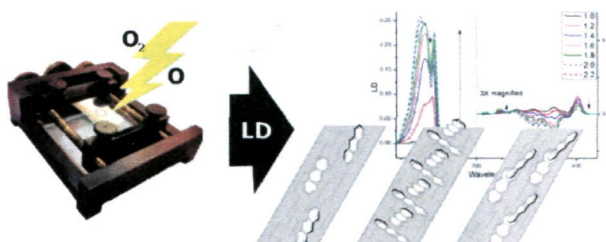


1372

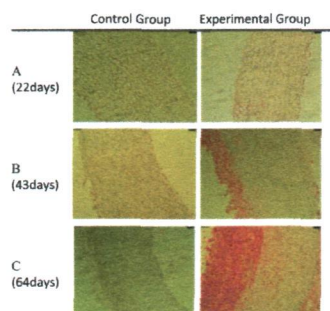
Oxidized polyethylene films for orienting polar molecules for linear dichroism spectroscopy

Kasra Razmkhah, Nikola Paul Chmel,* Matthew I. Gibson and Alison Rodger

Oxidized polyethylene (PE^{ox}) films allow for collection of much higher quality linear dichroism (LD) data than previously possible for both polar and non-polar small molecules.



1383

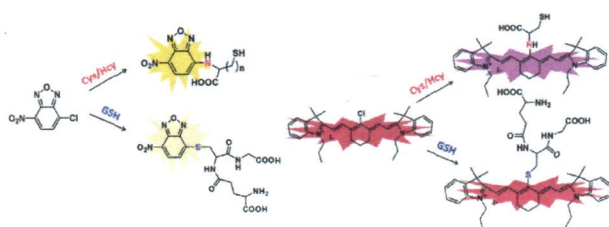


Liquid biopsy of atherosclerosis using protoporphyrin IX as a biomarker

Monica Nascimento da Silva, Letícia Bonfante Sicchieri, Flávia Rodrigues de Oliveira Silva, Maira Franco Andrade and Lilia Coronato Courrol*

Protoporphyrin IX (PPIX), a derivative of hematoporphyrin, can accumulate in rapidly growing tissues, including tumors and atherosclerotic plaques.

1389

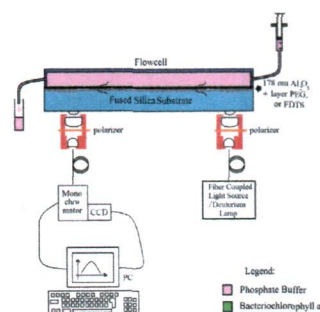


Fluorescent sensors for selective detection of thiols: expanding the intramolecular displacement based mechanism to new chromophores

Li-Ya Niu, Hai-Rong Zheng, Yu-Zhe Chen, Li-Zhu Wu, Chen-Ho Tung and Qing-Zheng Yang*

We expand the intramolecular displacement based mechanism to new chromophores, which may provide a powerful tool for selective detection of biothiols.

1396

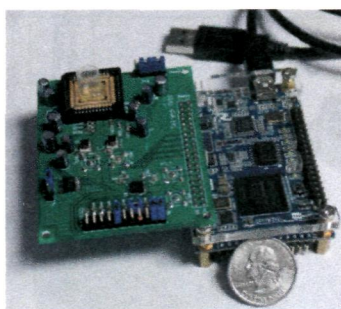


Extension of the broadband single-mode integrated optical waveguide technique to the ultraviolet spectral region and its applications

Rodrigo S. Wiederkehr and Sergio B. Mendes*

We report here the fabrication, characterization, and application of a single-mode integrated optical waveguide (IOW) spectrometer capable of acquiring optical absorbance spectra of surface-immobilized molecules in the visible and ultraviolet spectral region down to 315 nm.

1403



A handheld magnetic sensing platform for antigen and nucleic acid detection

Alex Pai, Aroutin Khachaturian, Stephen Chapman, Alexander Hu, Hua Wang and Ali Hajimiri*

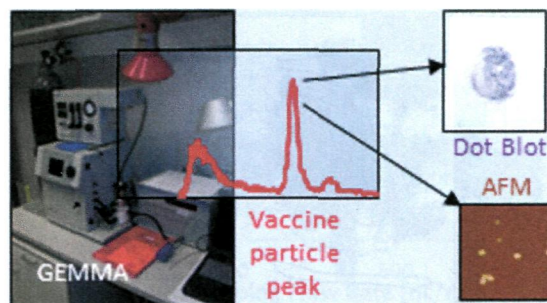
A portable magnetic-based biosensing platform is introduced for antigen and nucleic acid detection utilizing the "magnetic freezing" technique.

1412

Development of a bio-analytical strategy for characterization of vaccine particles combining SEC and nanoES GEMMA

Marlene Havlik, Martina Marchetti-Deschmann, Gernot Friedbacher, Paul Messner, Wolfgang Winkler, Laura Perez-Burgos, Christa Tauer and Günter Allmaier*

In order to characterize vaccine-nanoparticles during production and in the final formulation we developed a strategy combining SEC and nano-electrospray GEMMA (nanoparticle number concentration-based ion mobility device).

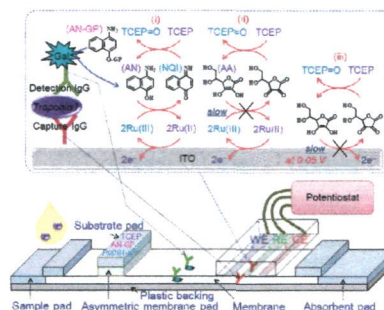


1420

An interference-free and rapid electrochemical lateral-flow immunoassay for one-step ultrasensitive detection with serum

Md. Rajibul Akanda, Hyou-Arm Joung, Vellaippillai Tamilavan, Seonhwa Park, Sinyoung Kim, Myung Ho Hyun, Min-Gon Kim* and Haesik Yang*

We report an interference-free electrochemical lateral-flow immunoassay that enables one-step ultrasensitive detection with serum.

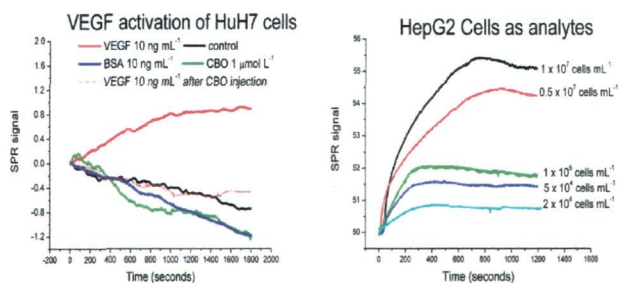


1426

On-line surface plasmon resonance biosensing of vascular endothelial growth factor signaling in intact-human hepatoma cell lines

E. Mauriz,* S. Carbajo-Pescador, R. Ordoñez, M. C. García-Fernández, J. L. Mauriz, L. M. Lechuga and J. González-Gallego

VEGF-VEGFR interactions in HepG2 and HuH7 hepatoma cell lines are studied by two different SPR detection formats involving either the immobilization of intact cells or the VEGF functionalization of sensor chips.

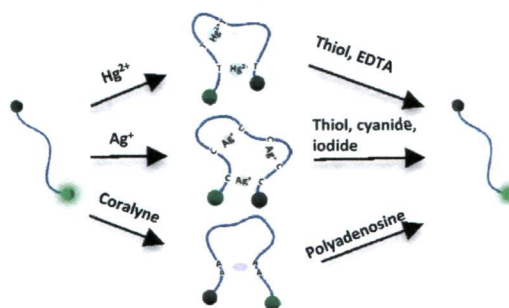


1436

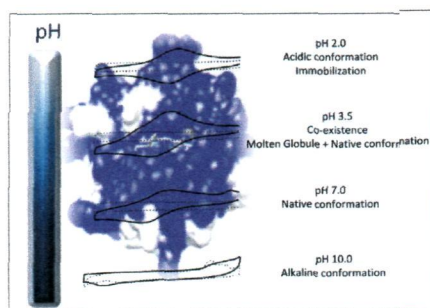
Design of two and three input molecular logic gates using non-Watson-Crick base pairing-based molecular beacons

Jia-Hui Lin and Wei-Lung Tseng*

A single, resettable, and sensitive molecular beacon has been developed to operate two-input, three-input, and set-reset logic gates.



1442

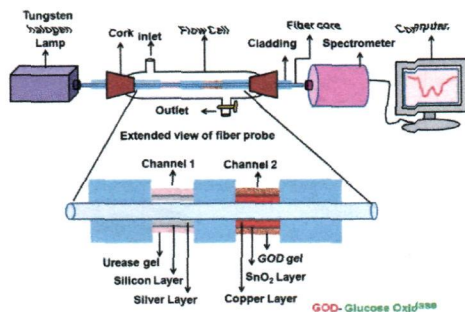


Screen-printed graphite macroelectrodes for the direct electron transfer of cytochrome c: a deeper study of the effect of pH on the conformational states, immobilization and peroxidase activity

Maria Gómez-Mingot, Vicente Montiel, Craig E. Banks* and Jesús Iniesta*

Electrochemical techniques have been used to study the pH-dependent dynamics of the direct charge-transfer processes of cytochrome c and the peroxidase activity after immobilization using SPGEs in a very wide range of pH values.

1449

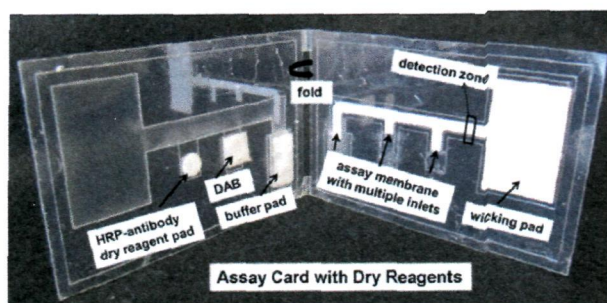


A novel approach for simultaneous sensing of urea and glucose by SPR based optical fiber multianalyte sensor

Roli Verma and Banshi D. Gupta*

A novel design is presented for the sensing of urea and glucose simultaneously by surface plasmon resonance based optical fiber multianalyte sensor using gel entrapment technique in a fluid for biomedical applications.

1456

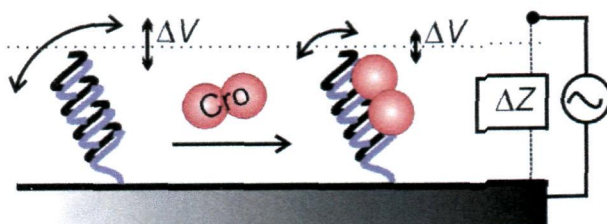


Long-term dry storage of an enzyme-based reagent system for ELISA in point-of-care devices

Sujatha Ramachandran,* Elain Fu, Barry Lutz and Paul Yager

A folding 2DPN device with incorporated dry reagents for automated ELISA.

1463



Multimodal electrochemical sensing of transcription factor-operator complexes

Keeshan Williams, Chung-Sei Kim, Jin Ryou Kim and Rastislav Levicky*

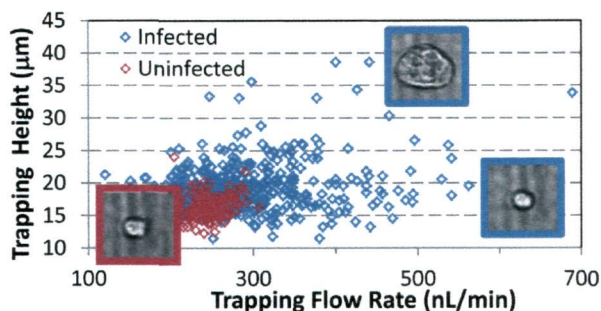
Changes in diffusive movements, surface potential, and interfacial impedance of DNA monolayers are combined to analyze binding of unlabeled transcription factors.

1472

Label free detection of pseudorabies virus infection in Vero cells using laser force analysis

Colin G. Hebert, Sean J. Hart and Alex Terray*

The rapid and robust identification of viral infections has broad implications for a number of fields, including medicine, biotechnology and biodefense.

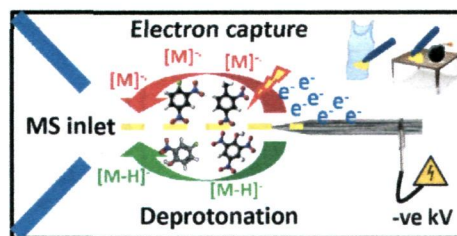


1482

Negative electro spray ionization on porous supporting tips for mass spectrometric analysis: electrostatic charging effect on detection sensitivity and its application to explosive detection

Melody Yee-Man Wong, Sin-Heng Man, Chi-Ming Che, Kai-Chung Lau and Kwan-Ming Ng*

The effect of supporting materials, including polyester, polyethylene and wood, on the detection sensitivity of a porous substrate-based negative ESI-MS technique was investigated.

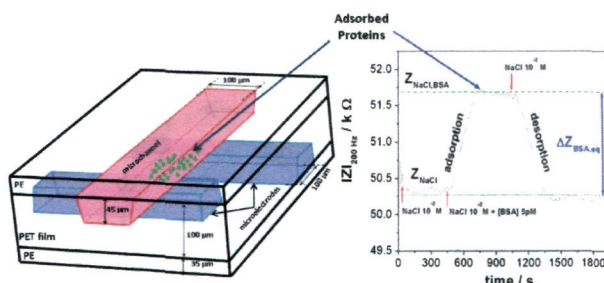


1492

Dynamics of BSA adsorption onto a photoablated polymer surface in a dielectric microchip

Mohammed kechadi, Lila Chaal, Bernard Tribollet and Jean Gamby*

Impedance sensorgrams of adsorbed proteins on a microchannel obtained using contactless microelectrodes in a dielectric microchip.

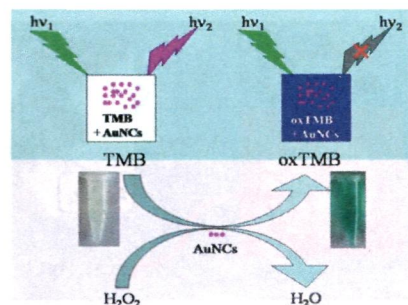


1498

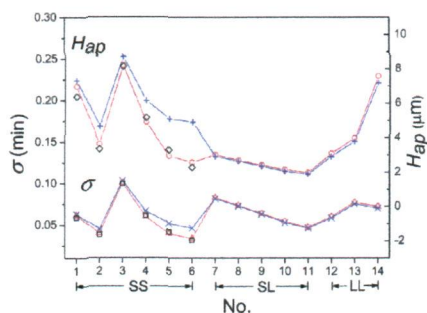
Colorimetric and ultra-sensitive fluorescence resonance energy transfer determination of H₂O₂ and glucose by multi-functional Au nanoclusters

Qian Zhao, Shenna Chen, Haowen Huang,*
Lingyang Zhang, Linqian Wang, Fengping Liu, Jian Chen, Yunlong Zeng and Paul K. Chu*

Colorimetric and ultra-sensitive FRET-based determination of H₂O₂ and glucose are developed by employing multi-functional AuNCs.



1504

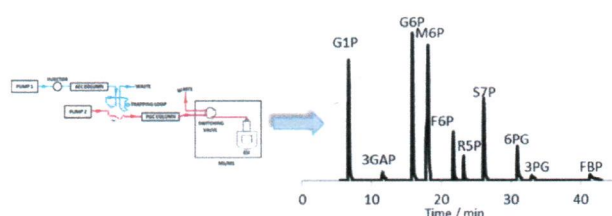


Evaluation of the peak variance in gradient liquid chromatography

Weiqliang Hao,* Bin Di,* Qiang Chen, Junde Wang, Yongbing Yang and Bangyi Yue

The peak variance is well predicted by using equations considering the variation of plate height with mobile phase composition.

1512

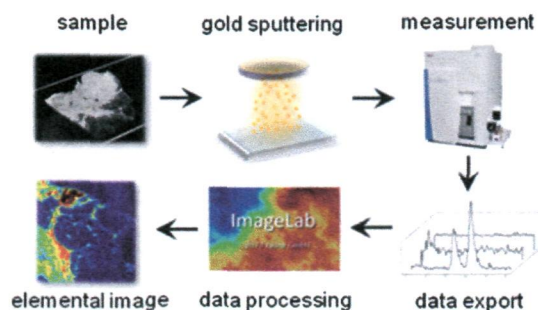


Fully automated on-line two-dimensional liquid chromatography in combination with ESI MS/MS detection for quantification of sugar phosphates in yeast cell extracts

Kristaps Klavins, Dinh Binh Chu, Stephan Hann and Gunda Koellensperger*

The developed LC-LC ESI-MS/MS method allowed coupling of separation power of anion exchange chromatography with ESI-MS/MS detection for quantification of ten sugar phosphates.

1521

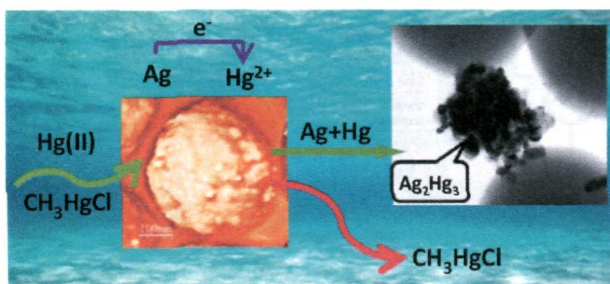


Application of gold thin-films for internal standardization in LA-ICP-MS imaging experiments

Maximilian Bonta,* Hans Lohninger, Martina Marchetti-Deschmann and Andreas Limbeck*

In this study the use of gold thin-layers for internal standardization in LA-ICP-MS imaging experiments was evaluated and applied; a quantitative imaging method has been developed.

1532



Submicron silica spheres decorated with silver nanoparticles as a new effective sorbent for inorganic mercury in surface waters

Tanya Yordanova, Penka Vasileva,* Irina Karadjova and Diana Nihtianova

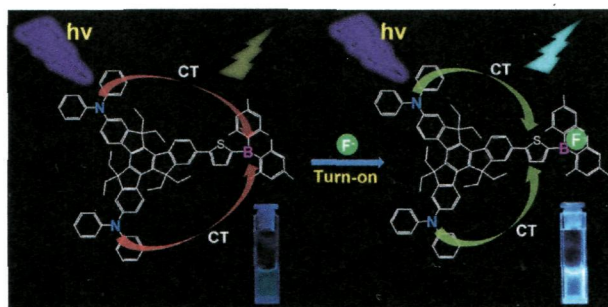
A nanocomposite material based on silver nanoparticles supported by silica submicrospheres was prepared and proved to be an efficient sorbent for the determination of inorganic mercury in surface waters.

1541

Truxene-cored π -expanded triarylborane dyes as single- and two-photon fluorescent probes for fluoride

Mao-Sen Yuan, Qi Wang, Wenji Wang, Dong-En Wang, Junru Wang and Jinyi Wang*

Two triarylboranes were synthesized and they exhibited high selectivity and sensitivity to fluoride as both single-photon and two-photon fluorescent probes.



1550

Selection of a DNA aptamer for cadmium detection based on cationic polymer mediated aggregation of gold nanoparticles

Yuangen Wu, Shenshan Zhan, Lumei Wang and Pei Zhou*

The DNA aptamer toward cadmium was selected by a novel SELEX strategy and further considered as a recognition element for the colorimetric detection of Cd(II).

