Volume 139 | Number 1 | 7 January 2014 | Pages 1–326

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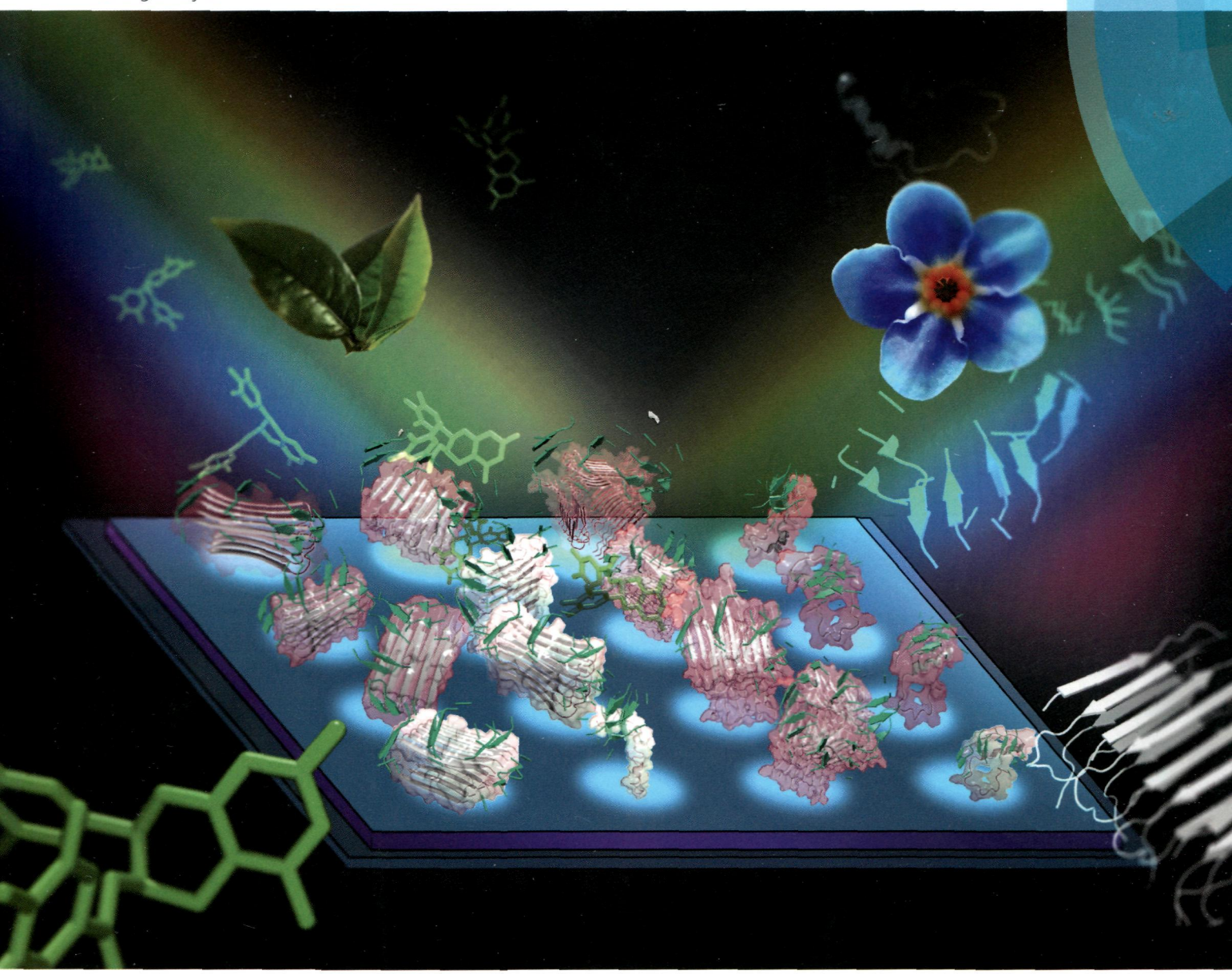

ISSN 0003-2654

ROYAL SOCIETY OF CHEMISTRY

HOT ARTICLE

Kagan Kerman *et al.*

LED-based interferometric reflectance imaging sensor for the detection of amyloid-β aggregation

Analyst

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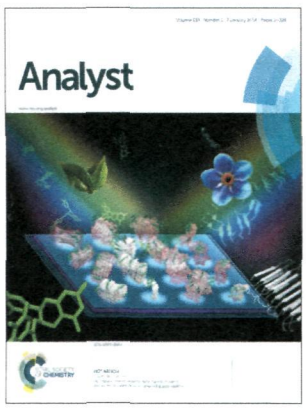
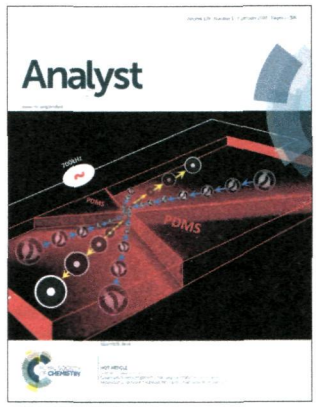
IN THIS ISSUE

ISSN 0003-2654 CODEN ANALAO 139(1) 1–326 (2014)

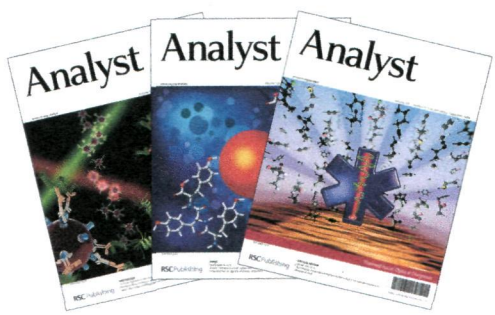


Cover
See Kagan Kerman *et al.*, pp. 59–65.
Image reproduced by permission of Kagan Kerman from *Analyst*, 2014, **139**, 59.



Inside cover
See Nathan S. Swami *et al.*, pp. 66–73.
Image reproduced by permission of Nathan S. Swami from *Analyst*, 2014, **139**, 66.

EDITORIALS



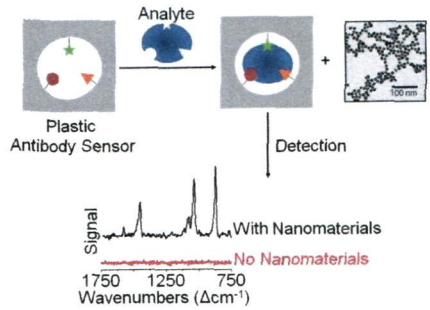
CRITICAL REVIEW

21

Advancements in nanosensors using plastic antibodies

Anna A. Volkert and Amanda J. Haes*

Specific analyte recognition with plastic antibody sensors and noble metal nanomaterials for "enhanced" molecular detection.



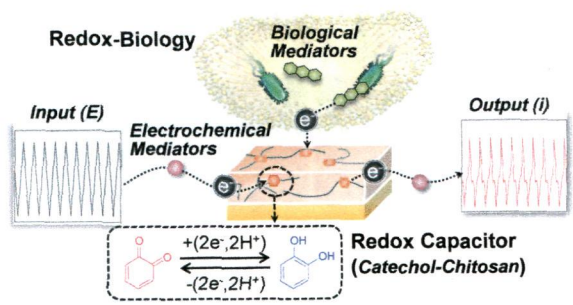
TUTORIAL REVIEW

32

Redox-capacitor to connect electrochemistry to redox-biology

Eunkyoung Kim, W. Taylor Leverage, Yi Liu, Ian M. White, William E. Bentley and Gregory F. Payne*

Grafted catechols enable chitosan films to accept, store and donate electrons. These redox-capacitor properties provide interesting capabilities for these films to "receive" and "process" redox information from biology.



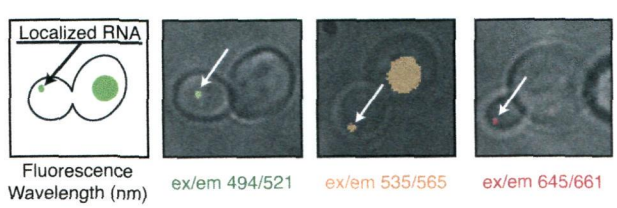
COMMUNICATIONS

44

Imaging of RNAs in live cells with spectrally diverse small molecule fluorophores

Tucker J. Carrocci and Aaron A. Hoskins*

A novel approach for fluorescent labeling of RNAs in live cells is presented.

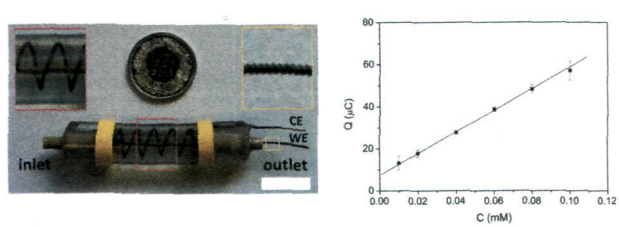


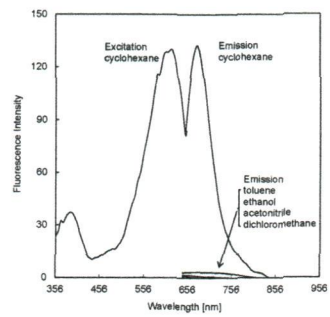
48

A low-cost thin layer coulometric microfluidic device based on an ion-selective membrane for calcium determination

Denis Dorokhin, Gastón A. Crespo, Majid Ghahraman Afshar and Eric Bakker*

A prototype of a low-cost and easy-to-use thin layer coulometric microfluidic device based on an ion-selective membrane for calcium detection is described.

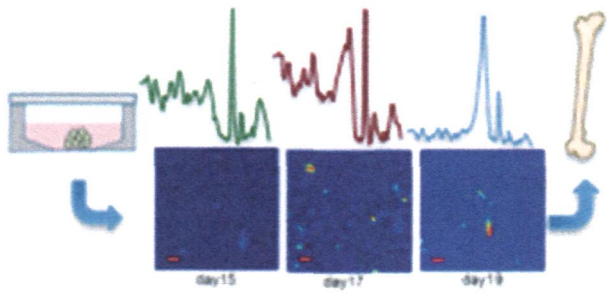




A long wavelength hydrophobic probe for intracellular lipid droplets

Jingying Zhai, Yawen Zhang, Chenye Yang, Yanmei Xu and Yu Qin*

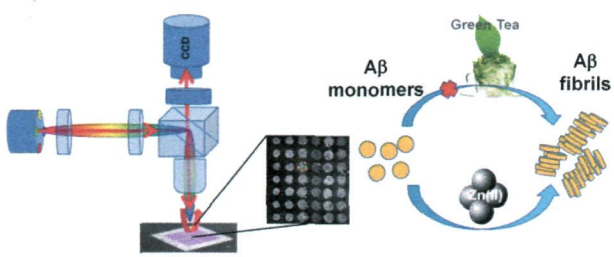
A highly stable, long wavelength polarity sensitive probe, 8-nitrophenyl-3,5-dipiperidine-4,4-difluoro-4-bora-3*a*,4*a*-diaza-*s*-indacene (**NPBDP**), was developed for living cell imaging of intracellular lipid droplets by fluorescence microscopy.



Monitoring the mineralisation of bone nodules *in vitro* by space- and time-resolved Raman micro-spectroscopy

Adrian Ghita, Flavius C. Pascut, Virginie Sottile and Ioan Notingher*

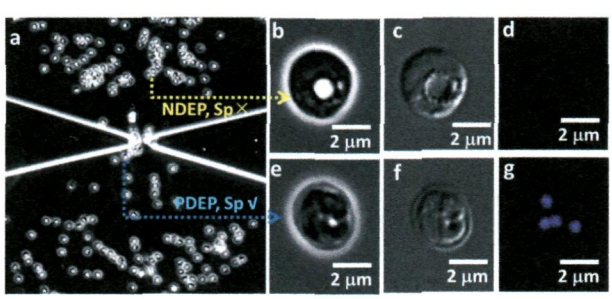
Label-free Raman spectral imaging reveals temporal and spatial changes in chemical properties of bone nodules grown *in vitro*.



LED-based interferometric reflectance imaging sensor for the detection of amyloid-β aggregation

Xin R. Cheng, George G. Daaboul, M. Selim Ünlü and Kagan Kerman*

Interferometric reflectance imaging sensor (IRIS) is developed to monitor the effects of small molecules on amyloid-β (Aβ) aggregation.



Quantitative dielectrophoretic tracking for characterization and separation of persistent subpopulations of *Cryptosporidium parvum*

Yi-Hsuan Su, Mikiyas Tsegaye, Walter Varhue, Kuo-Tang Liao, Lydia S. Abebe, James A. Smith, Richard L. Guerrant and Nathan S. Swami*

Quantitative dielectrophoretic tracking of individual microbials is applied to characterize persistent *versus* sensitive subpopulations of *Cryptosporidium parvum* with phenotypically different alterations.

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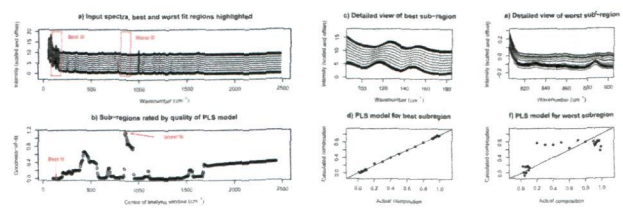
Quantification of pharmaceuticals *via* transmission Raman spectroscopy: data sub-selection

Jonathan C. Burley,* Adeyinka Aina, Pavel Matousek and Christopher Brignell

We report the first systematic characterisation of data sub-selection with multivariate analysis to be applied to either TRS or the low-wavenumber Raman region.



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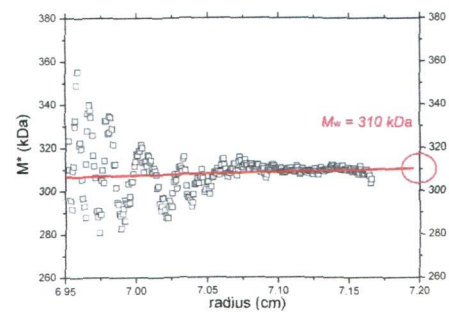
SEDFIT–MSTAR: molecular weight and molecular weight distribution analysis of polymers by sedimentation equilibrium in the ultracentrifuge

Peter Schuck,* Richard B. Gillis, Tabot M. D. Besong, Fahad Almutairi, Gary G. Adams, Arthur J. Rowe and Stephen E. Harding*

A new adaptation of sedimentation equilibrium in the analytical ultracentrifuge provides a user-friendly method for the analysis of molecular weights of polymers.



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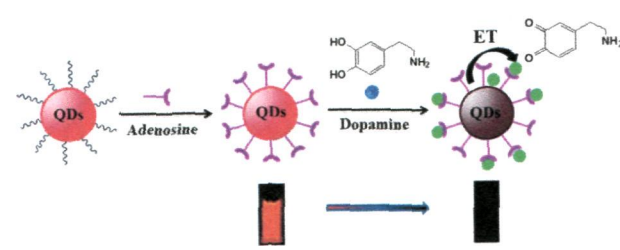
Adenosine capped QDs based fluorescent sensor for detection of dopamine with high selectivity and sensitivity

Qin Mu, Hu Xu, Yan Li,* Shijian Ma and Xinhua Zhong*

A facile fluorescence sensor based on adenosine capped QDs was developed for detection of dopamine in human urine samples.

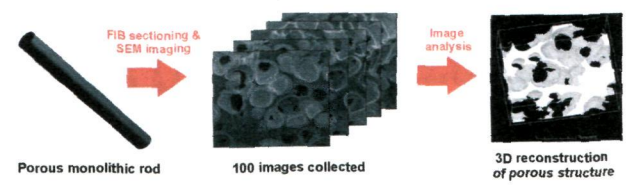


99

Focussed ion beam serial sectioning and imaging of monolithic materials for 3D reconstruction and morphological parameter evaluation

Mercedes Vázquez,* David Moore, Xiaoyun He, Aymen Ben Azouz, Ekaterina Nesterenko, Pavel Nesterenko, Brett Paull and Dermot Brabazon

A new characterisation method, based on the utilisation of focussed ion beam-scanning electron microscopy (FIB-SEM), has been employed for the 3D reconstruction of porous carbon and silica-based monoliths.



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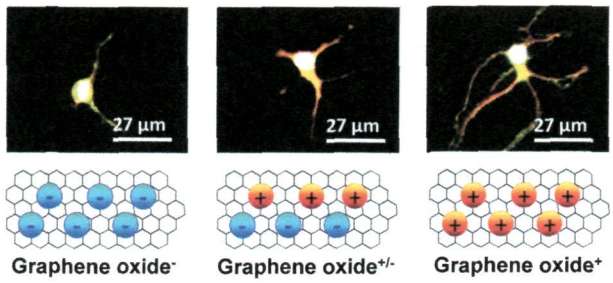

Effects of surface charges of graphene oxide on neuronal outgrowth and branching

Qin Tu, Long Pang, Yun Chen, Yanrong Zhang, Rui Zhang, Bingzhang Lu and Jinyi Wang*

Graphene oxide substrates with different surface charges were fabricated and their effects on neuronal outgrowth and branching were investigated.

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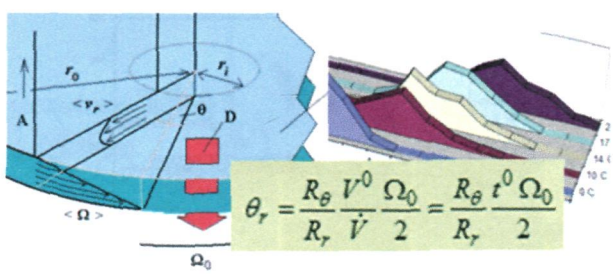

Retention in continuous two-dimensional thermal field-flow fractionation: comparison of experimental results with theory

Pertti Vastamäki,* P. Stephen Williams, Matti Jussila, Michel Martin and Marja-Liisa Riekkola

A new theoretical model for a continuous 2D thermal field-flow fractionation method is developed and theoretical and experimental results compared.

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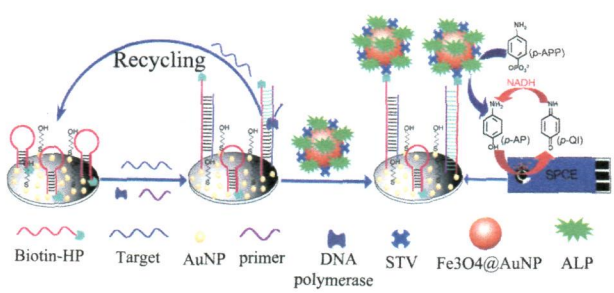

Cascade signal amplification for ultrasensitive electrochemical DNA detection

Jin Xu, Qiong Wang, Yun Xiang,* Ruo Yuan and Yaqin Chai

Cascade signal amplification is achieved by the integration of strand displacement polymerase reaction-assisted target recycling and multi-enzyme labels with redox-recycling.

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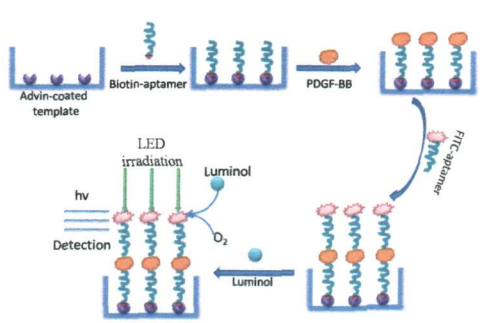
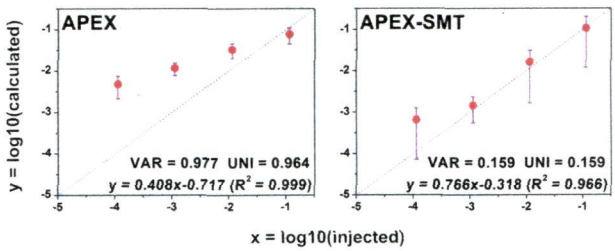
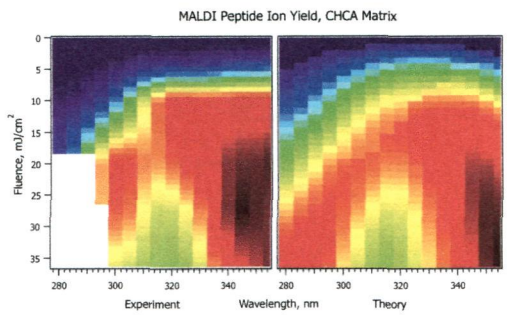


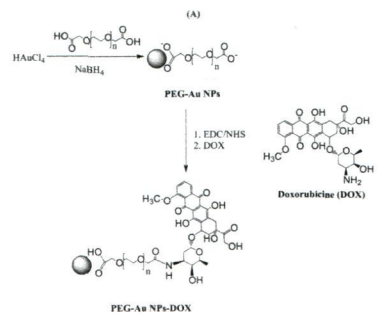
A highly sensitive LED-induced chemiluminescence platform for aptasensing of platelet-derived growth factor

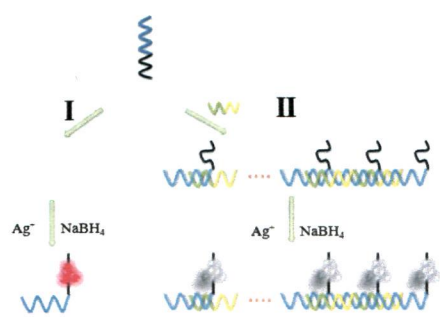
Xinfeng Zhang,* Hui Zhang, Shuxia Xu and Yonghua Sun

A simple and highly sensitive LED-CL platform for aptasensing of proteins was demonstrated. It was based on the phenomenon that FITC tagged aptamer strongly catalyzed the reaction between luminol and dissolved oxygen under LED irradiation.









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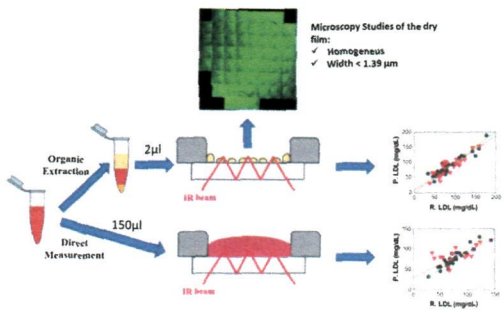

Chemometric determination of lipidic parameters in serum using ATR measurements of dry films of solvent extracts

David Perez-Guaita, Angel Sanchez-Illana, Josep Ventura-Gayete, Salvador Garrigues* and Miguel de la Guardia

Accuracy and precision of lipidic compounds determination in sera were improved through solvent extraction and ATR-FTIR measurements.

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Immobilized phage proteins for specific detection of staphylococci

Hicham Chibli, Hala Ghali, Soonhyang Park, Yves-Alain Peter and Jay L. Nadeau*

The ability of specific phage proteins to bind Staphylococci was studied using clearing assays and by functionalization on silicon wafers followed by light microscopy. The principal is generalizable to many different biosensor platforms, including label free systems such as optical microresonators.

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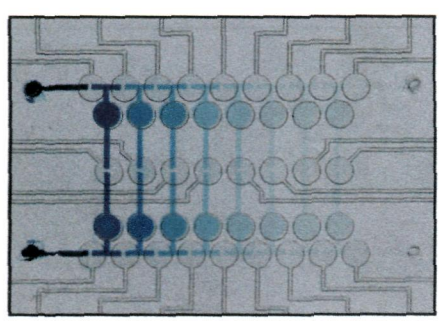

Microfluidic serial dilution ladder

Siavash Ahrar, Michelle Hwang, Philip N. Duncan and Elliot E. Hui*

We report a new structure for serial dilution that works by sequentially mixing the rungs of a microfluidic ladder structure.

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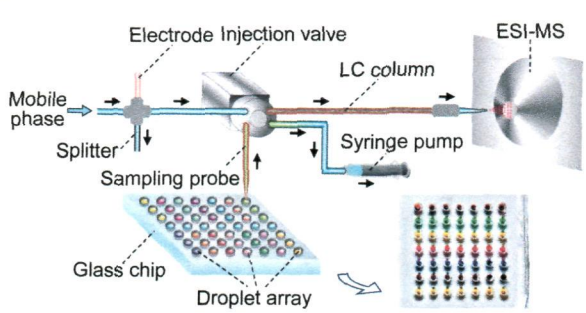
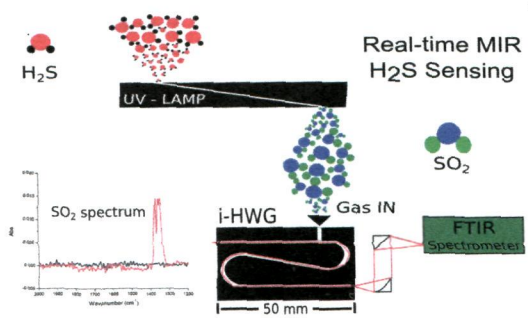
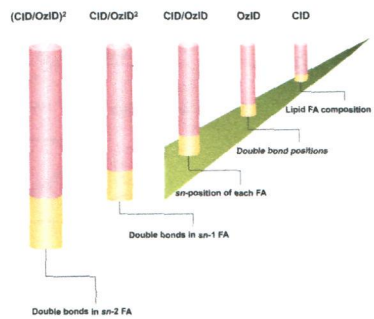


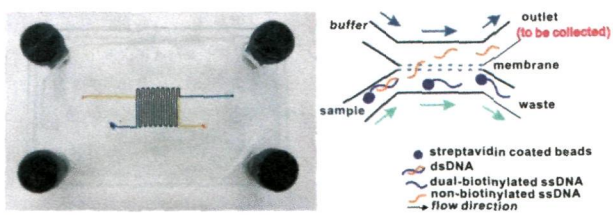
Coupling liquid chromatography/mass spectrometry detection with microfluidic droplet array for label-free enzyme inhibition assay

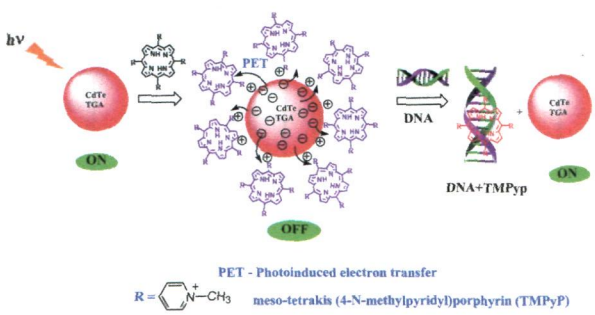
Xiu-Li Wang, Ying Zhu and Qun Fang*

We developed a droplet-based microfluidic system coupled with liquid chromatography/mass spectrometry for fast separation and high-information-content detection of nanoliter-scale droplets for enzyme inhibition assay, which provides a novel interface method for LC/MS and droplet-array chip.









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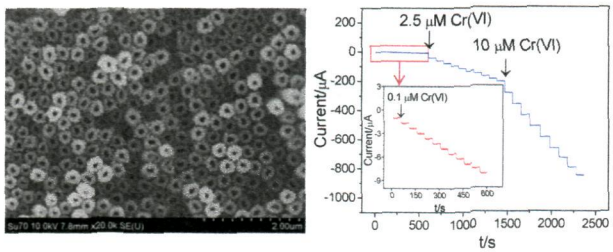

Sensitive and selective electrochemical detection of chromium(VI) based on gold nanoparticle-decorated titania nanotube arrays

Wei Jin, Guosheng Wu and Aicheng Chen*

Owing to the severe toxicity and mobility of Cr(VI) in biological and environmental systems, it is of great importance to develop convenient and reliable methods for its detection.

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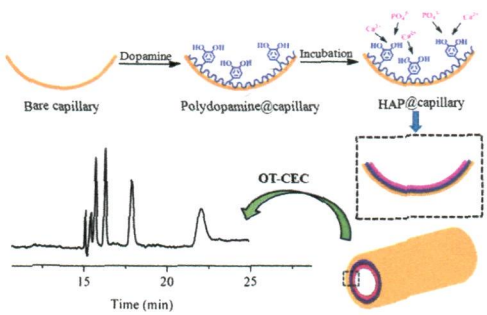

Mussel-inspired polydopamine-assisted hydroxyapatite as the stationary phase for capillary electrochromatography

Juan Zhang, Wenpeng Zhang, Tao Bao and Zilin Chen*

A novel capillary with hydroxyapatite (HAP) as the stationary phase was prepared for open-tubular capillary electrochromatography (OT-CEC).

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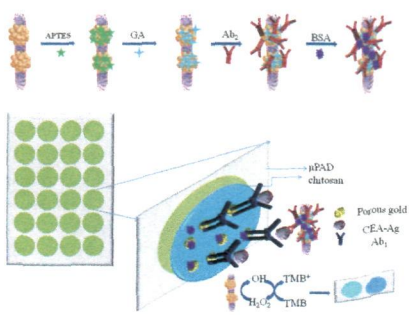

Paper-based colorimetric immunosensor for visual detection of carcinoembryonic antigen based on the high peroxidase-like catalytic performance of $ZnFe_2O_4$–multiwalled carbon nanotubes

Weiyan Liu, Hongmei Yang, Yanan Ding, Shenguang Ge, Jinghua Yu, Mei Yan* and Xianrang Song*

Paper-based colorimetric immunosensor for visual detection of CEA based on the high peroxidase-like catalytic performance of $ZnFe_2O_4$@MWNTs.

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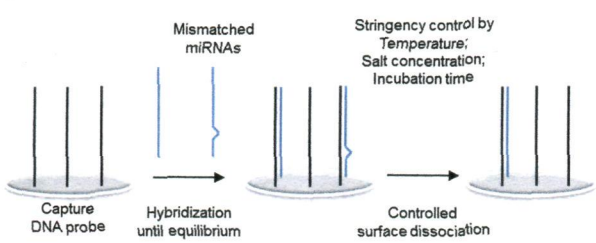


Highly improved specificity for hybridization-based microRNA detection by controlled surface dissociation

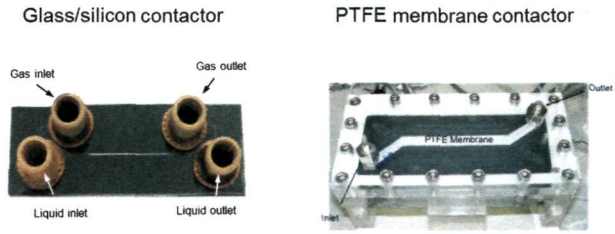
Hye Ryeon Yoon, Jeong Min Lee, Juyeon Jung, Chang-Soo Lee, Bong Hyun Chung* and Yongwon Jung*

A detailed analysis of microRNA surface hybridization and dissociation offered a generally applicable hybridization strategy for microRNA detection with highly improved specificity.

Stripping of acetone from water with microfabricated and membrane gas–liquid contactors

Achilleas Constantinou, Francesco Ghiotto, Koon Fung Lam and Asterios Gavriilidis*

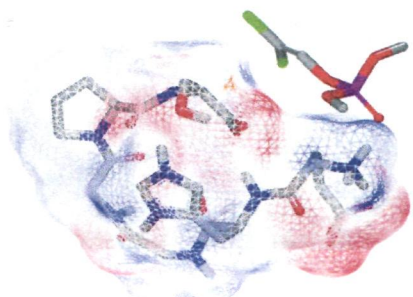
A glass/silicon contactor containing micropillars shows improved performance for volatile stripping from water compared to a porous PTFE membrane contactor.



Design, synthesis and characterization of a hexapeptide bio-inspired by acetylcholinesterase and its interaction with pesticide dichlorvos

Glauco Pilon dos Santos, Bianca Ferreira da Silva, Saulo Santesso Garrido, Marcello Mascini and Hideko Yamanaka*

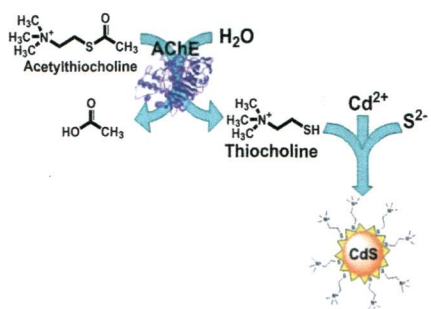
We present a new hexapeptide bio-inspired by the active site of acetylcholinesterase enzyme.



Thiocholine mediated stabilization of *in situ* produced CdS quantum dots: application for the detection of acetylcholinesterase activity and inhibitors

Gaizka Garai-Ibabe, Laura Saa and Valeri Pavlov*

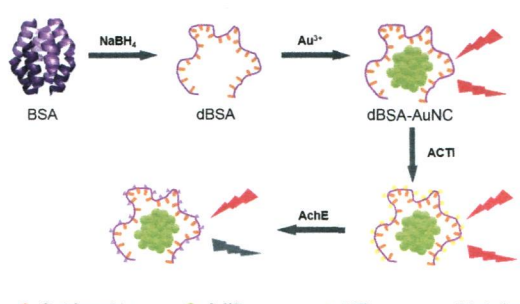
Highly sensitive detection of acetylcholinesterase activity and inhibitors based on the *in situ* generation of CdS quantum dots.



Selective and sensitive detection of acetylcholinesterase activity using denatured protein-protected gold nanoclusters as a label-free probe

Hongchang Li, Yuxin Guo, Lehui Xiao* and Bo Chen*

The proposed method using denatured bovine serum albumin and Au nanoclusters (dBSA–AuNCs) as a label-free probe can detect acetylcholinesterase (AChE) selectively and sensitively in serum without any pretreatment.



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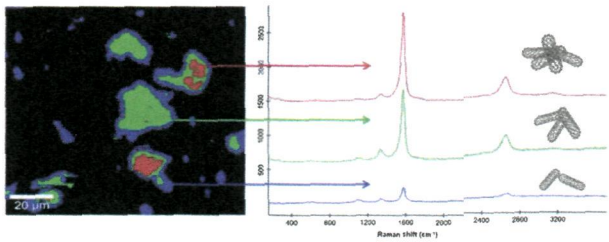
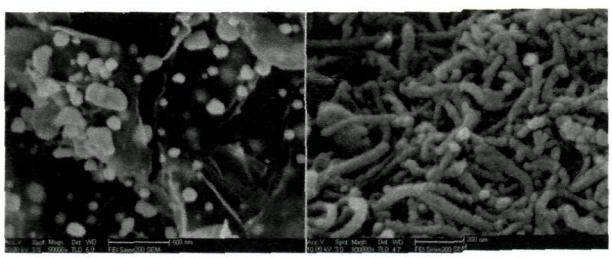


Raman spectroscopic characterization of single walled carbon nanotubes: influence of the sample aggregation state

A. I. López-Lorente, B. M. Simonet and M. Valcárcel*

The aggregation state of SWNTs has been proved to influence their G-/D-band intensity ratios in Raman spectroscopy.

299



Aptasensor based on the synergistic contributions of chitosan–gold nanoparticles, graphene–gold nanoparticles and multi-walled carbon nanotubes-cobalt phthalocyanine nanocomposites for kanamycin detection

Xia Sun, Falan Li, Guanghui Shen, Jiadong Huang* and Xiangyou Wang*

We have developed an ultrasensitive and highly specific electrochemical aptasensor for kanamycin detection based on an aptamer/target/aptamer configuration.

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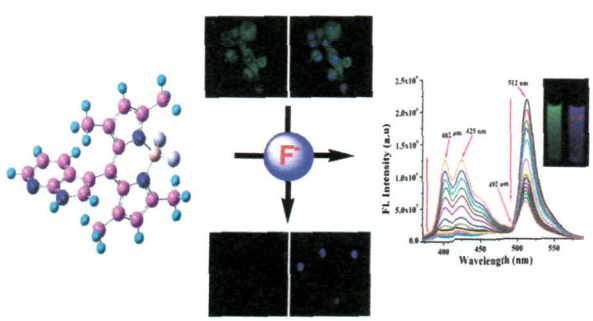

Ratiometric sensing of fluoride and acetate anions based on a BODIPY-azaindole platform and its application to living cell imaging

Ajit Kumar Mahapatra,* Rajkishor Maji, Kalipada Maiti, Susanta Sekhar Adhikari, Chitrangada Das Mukhopadhyay and Debasish Mandal

Ratiometric fluorescent sensor for F^- and AcO^- based on a combination of BODIPY dye and azaindole moiety.

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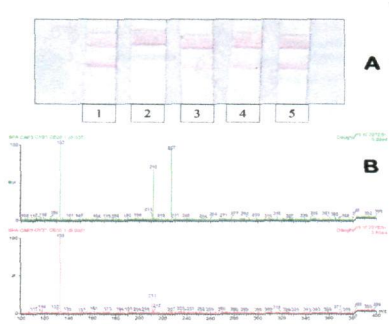

Bisphenol A determination in baby bottles by chemiluminescence enzyme-linked immunosorbent assay, lateral flow immunoassay and liquid chromatography tandem mass spectrometry

Elisabetta Maiolini, Elida Ferri, Agata Laura Pitasi, Angel Montoya, Manuela Di Giovanni, Ermanno Errani and Stefano Girotti*

(A) LFIA for bisphenol A: (1) blank, no BPA; (2) 10 μg mL^{-1} BPA; (3) 1 μg mL^{-1} BPA; (4) 0.1 μg mL^{-1} BPA; (5) 0.01 μg mL^{-1} BPA. (B) LC-MS/MS spectra.