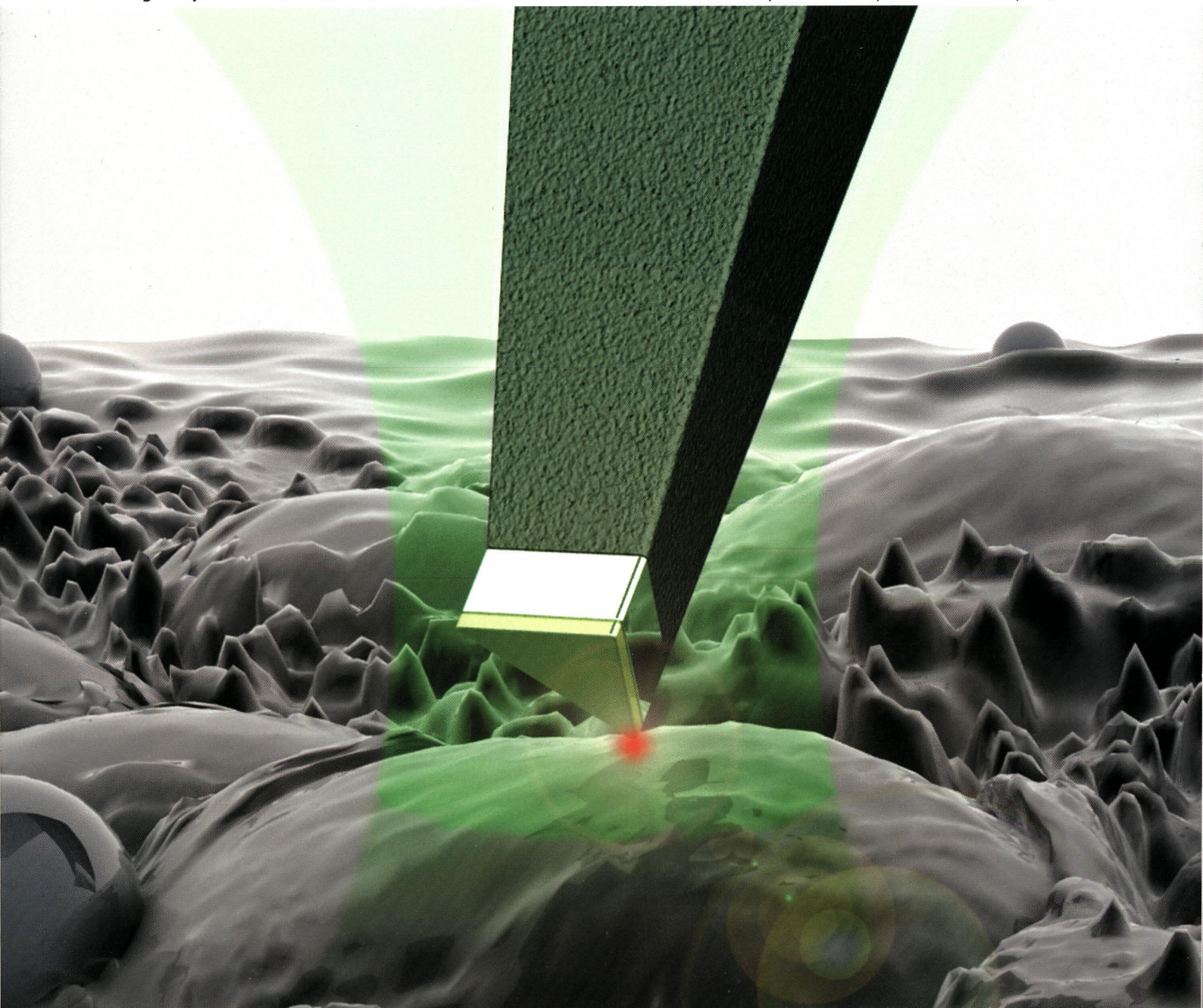


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Analyst

www.rsc.org/analyst

Volume 138 | Number 19 | 7 October 2013 | Pages 5505–5840



ISSN 0003-2654

RSC Publishing

HOT ARTICLE

Seunghun Hong, Yung Doug Suh *et al.*
Multilayered nano-prism vertex tips for
tip-enhanced Raman spectroscopy and imaging



0003-2654 (2013) 138:19;1-S

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ISSN 0003-2654 CODEN ANALAO 138(19) 5505–5840 (2013)



Cover

See Seunghun Hong, Yung Doug Suh *et al.*, pp. 5588–5593.
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Inside cover

See Admir Masic *et al.*, pp. 5594–5599.
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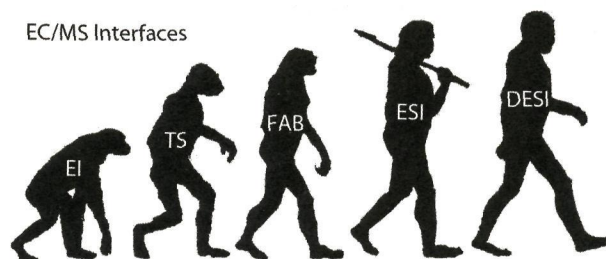
MINIREVIEW

5519

Recent advances of electrochemical mass spectrometry

Pengyuan Liu, Mei Lu, Qiuling Zheng, Yun Zhang, Howard D. Dewald and Hao Chen*

This review article surveys some recent developments of electrochemistry in combination with mass spectrometry including instrumentation and bioanalytical applications.



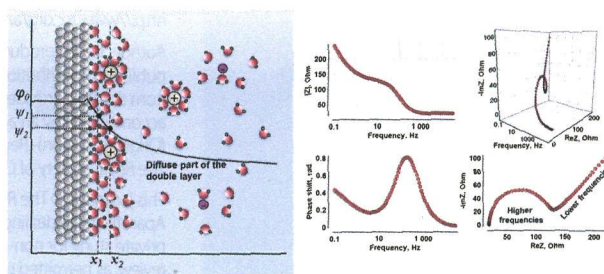
CRITICAL REVIEW

5540

Exploring the interfaces between metal electrodes and aqueous electrolytes with electrochemical impedance spectroscopy

Aliaksandr S. Bandarenka*

This review focuses on recent achievements in the characterisation of the interfaces between metal electrodes and aqueous electrolytes using electrochemical impedance spectroscopy.



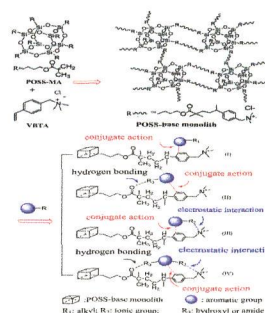
Федеральное государственное
бюджетное учреждение науки
Центральная научная библиотека
Уральского отделения
Российской академии наук (ЦНБ УрО РАН)

5555

Polyhedral oligomeric silsesquioxane (POSS)-based multifunctional organic–silica hybrid monoliths

Xucong Lin,* Na Zheng, Jinzhen Wang, Xiao Wang, Yanqiong Zheng and Zenghong Xie

A facile polyhedral oligomeric silsesquioxane (POSS)-based hybrid monolith with multiple mechanisms was developed by an *in situ* polymerization.

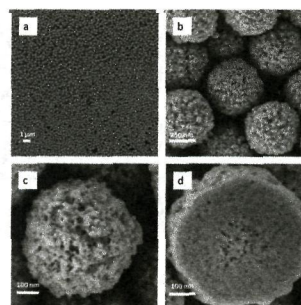


5559

3D nanoporous Ag@BSA composite microspheres as hydrogen peroxide sensors

Quanwen Liu,* Ting Zhang, Lili Yu, Nengqin Jia and Da-Peng Yang*

3D nanoporous Ag@BSA composite microspheres were successfully prepared through a protein-directed approach.

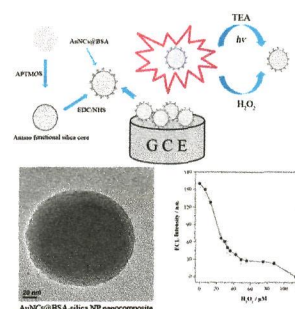


5563

A novel solid-state electrochemiluminescence sensor for the determination of hydrogen peroxide based on an Au nanocluster–silica nanoparticle nanocomposite

Yanfang Wu, Jinhua Huang, Tingyao Zhou, Mingcong Rong, Yaqi Jiang and Xi Chen*

An AuNC@BSA–silica NP composite has been synthesized and used for the solid-state ECL sensing of H₂O₂.

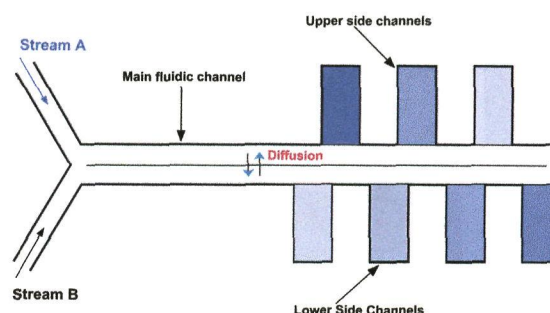


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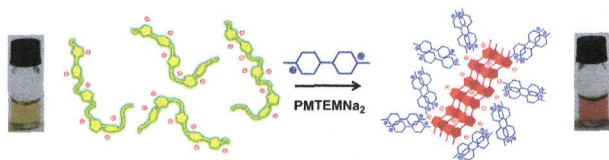
Generation of a chemical gradient across an array of 256 cell cultures in a single chip

Himali Somaweera, Akif Ibragimov and Dimitri Pappas*

A microfluidic diffusion diluter to create stable chemical gradients across an array of cell cultures was demonstrated.



5572

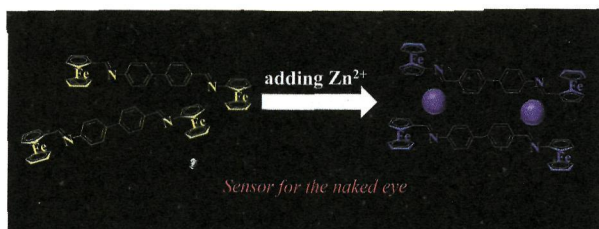


Colorimetric and fluorescent dual detection of paraquat and diquat based on an anionic polythiophene derivative

Zhiyi Yao, Xianping Hu, Wenjuan Ma, Xueliang Chen, Li Zhang, Junhua Yu, Yuliang Zhao and Hai-Chen Wu*

A colorimetric and fluorescent dual-response probe for the detection of paraquat and diquat in aqueous solutions has been developed based on an anionic polythiophene derivative.

5576

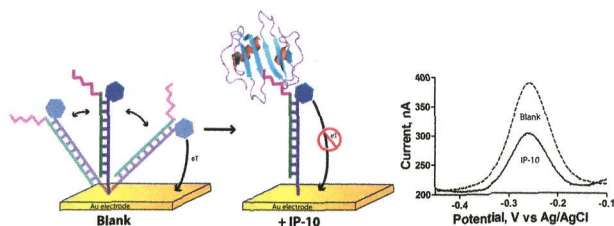


New molecular probe for the selective detection of zinc ion

Hong Wang,* Chun-Lin Sun, Yong-Hao Yue, Fen-Fen Yin, Jian-Qiao Jiang, Hao-Rui Wu and Hao-Li Zhang*

A new multisignaling molecular probe **DFDB** was designed for the selective detection of Zn^{2+} . **DFDB** can be synthesized by a simple one-step reaction in high yield. Theoretical calculation suggests a novel sandwich structure of the **DFDB**· Zn^{2+} complex.

5580

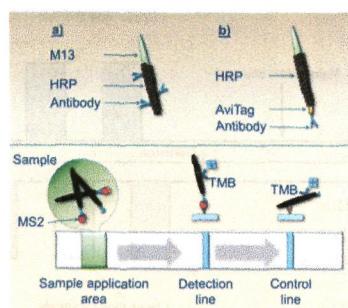


Detection of IP-10 protein marker in undiluted blood serum via an electrochemical E-DNA scaffold sensor

Andrew J. Bonham, Nicole G. Paden, Francesco Ricci and Kevin W. Plaxco*

We describe a reusable, label-free, electrochemical analog of fluorescence polarization that quantitatively measures the chemokine IP-10 in undiluted blood serum.

5584



Functionalized viral nanoparticles as ultrasensitive reporters in lateral-flow assays

Meena Adhikari, Sagar Dhamane, Anna E. V. Hagström, Gavin Garvey, Wen-Hsiang Chen, Katerina Kourentzi, Ulrich Strych and Richard C. Willson*

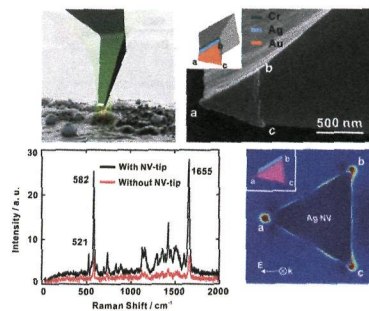
Increased-sensitivity immunochromatographic assay employing viral nanoparticles functionalized with antibodies and multiple enzymatic reporters.

5588

Multilayered nano-prism vertex tips for tip-enhanced Raman spectroscopy and imaging

Taekyeong Kim, Ki-Seok Jeon, Kwang Heo, Hyung Min Kim, Juhun Park, Yung Doug Suh* and Seunghun Hong*

We developed a method to mass-produce pristine multilayered nano-prism vertex (NV) tips for tip-enhanced Raman spectroscopy analysis of materials, where the structure and orientation of the NV can be precisely controlled in terms of its size, thickness, and shape.

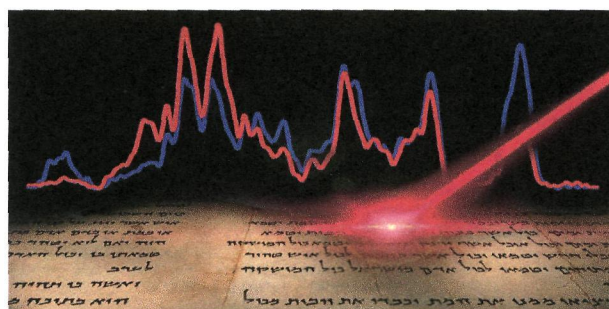


5594

Quantifying degradation of collagen in ancient manuscripts: the case of the Dead Sea Temple Scroll

R. Schütz, L. Bertinetti, I. Rabin, P. Fratzi and A. Masic*

A quantitative method based on polarized Raman spectroscopy was developed to assess the degree of collagen degradation in historical parchments.

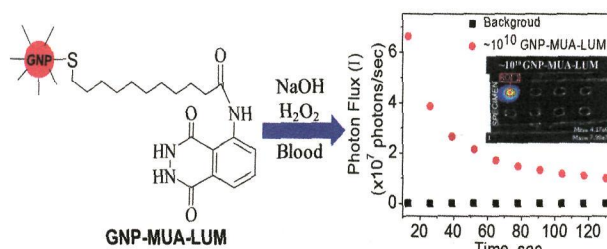


5600

Luminol-labeled gold nanoparticles for ultrasensitive chemiluminescence-based chemical analyses

Lateef U. Syed, Luxi Zhang Swisher, Hannah Huff, Caitlin Rochford, Fengli Wang, Jianwei Liu, Judy Wu, Mark Richter, Sivasai Balivada, Deryl Troyer and Jun Li*

Highly sensitive chemiluminescence methods have been demonstrated by covalently attaching luminol molecules to 10 nm diameter gold nanoparticles as nanocarriers.

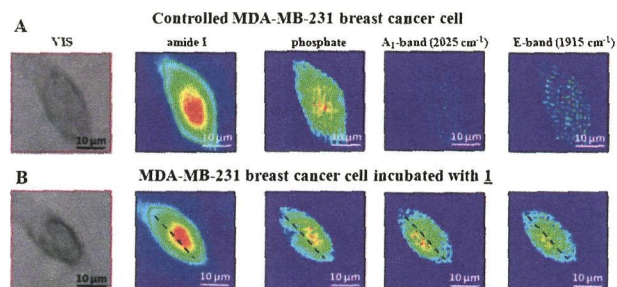


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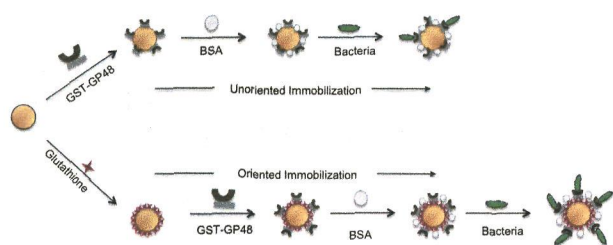
Toward optimal spatial and spectral quality in widefield infrared spectromicroscopy of IR labelled single cells

Eric C. Mattson, Miriam Unger, Sylvain Clède, François Lambert, Clotilde Policar, Asher Imtiaz, Roshan D'Souza and Carol J. Hirschmugl*

Advancements in widefield infrared spectromicroscopy have recently been demonstrated following the commissioning of IRENI (InfraRed ENvironmental Imaging), a Fourier Transform infrared (FTIR) chemical imaging beamline at the Synchrotron Radiation Center.



5619

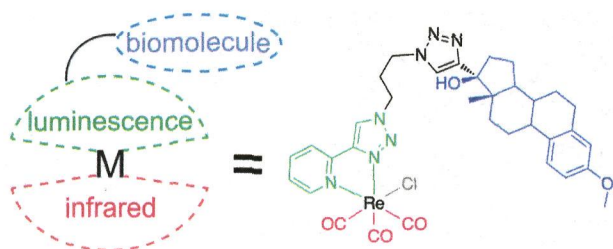


Phage receptor binding protein-based magnetic enrichment method as an aid for real time PCR detection of foodborne bacteria

Somayyeh Poshtiban, Muhammad Afzal Javed, Denis Arutyunov, Amit Singh, Graham Banting, Christine M. Szymanski and Stephane Evoy*

We present a novel phage receptor binding protein-based magnetic separation and pre-enrichment method as an upstream sample preparation method to prevent PCR inhibition by matrix-related refractory components.

5627

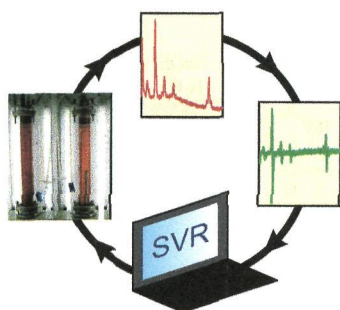


Detection of an estrogen derivative in two breast cancer cell lines using a single core multimodal probe for imaging (SComPI) imaged by a panel of luminescent and vibrational techniques

S. Clède, F. Lambert, C. Sandt, S. Kascakova, M. Unger, E. Harté, M.-A. Plamont, R. Saint-Fort, A. Deniset-Besseau, Z. Gueroui, C. Hirschmugl, S. Lecomte, A. Dazzi, A. Vessières and C. Polcar*

A multimodal rhenium-centred core to image an estrogen derivative using correlative luminescence and vibrational spectroscopies.

5639

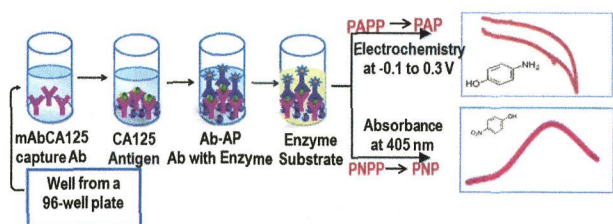


Combined shifted-excitation Raman difference spectroscopy and support vector regression for monitoring the algal production of complex polysaccharides

Kristina Noack, Björn Eskofier, Johannes Kiefer,* Christina Dilk, Georg Bilow, Matthias Schirmer, Rainer Buchholz and Alfred Leipertz

A novel analytical approach for monitoring of photobioreactors is presented, which will allow bioprocess control and optimization in the future.

5647



Dual detection of cancer biomarker CA125 using absorbance and electrochemical methods

Israa Al-Ogaidi, Zoraida P. Aguilar,* Savan Suri, Honglei Gou and Nianqiang Wu*

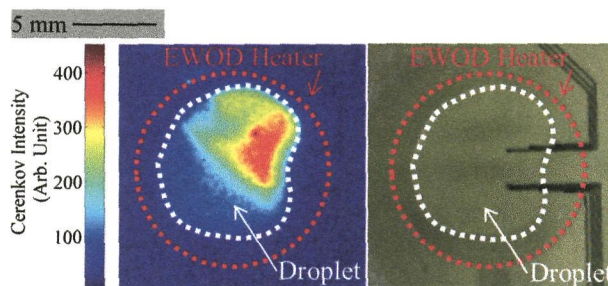
Dual detection of CA125 in alkaline phosphatase labeled ELISA using nanoelectrode array detection (−0.1 to 0.3 V) and absorbance detection (λ 405 nm).

5654

Optimization of microfluidic PET tracer synthesis with Cerenkov imaging

Alex A. Dooraghi, Pei Y. Keng, Supin Chen, Muhammad R. Javed, Chang-Jin "CJ" Kim, Arion F. Chatziioannou and R. Michael van Dam*

Cerenkov imaging reveals radioactivity distribution during synthesis of radiolabeled compounds in microfluidic chips.

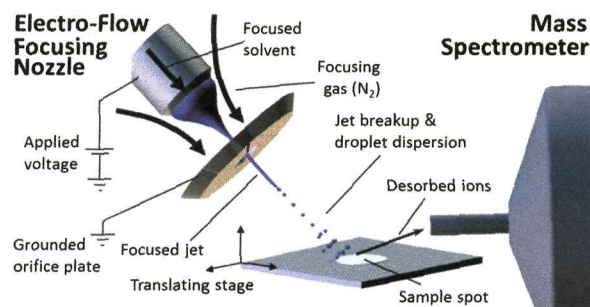


5665

Desorption electro-flow focusing ionization of explosives and narcotics for ambient pressure mass spectrometry

Thomas P. Forbes,* Tim M. Brewer and Greg Gillen

Desorption electro-flow focusing ionization for ambient pressure mass spectrometry was developed, demonstrating notable performance for low pressures and electric potential operation.

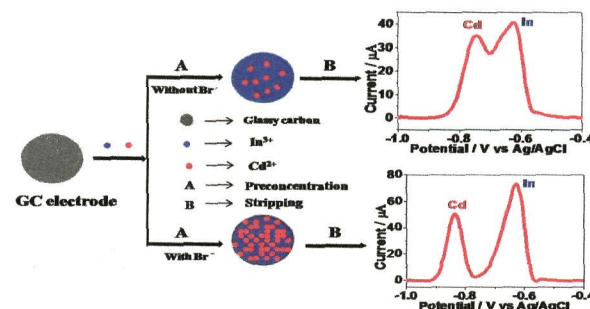


5674

Anodic stripping voltammetric determination of cadmium using a "mercury free" indium film electrode

Sukeri Anandhakumar, Jayaraman Mathiyarasu* and Kanala Lakshimi Narasimha Phani

Using an indium modified electrode in the presence of bromide ions, we demonstrate improved peak-separation between cadmium and indium enabling sensitive cadmium detection.

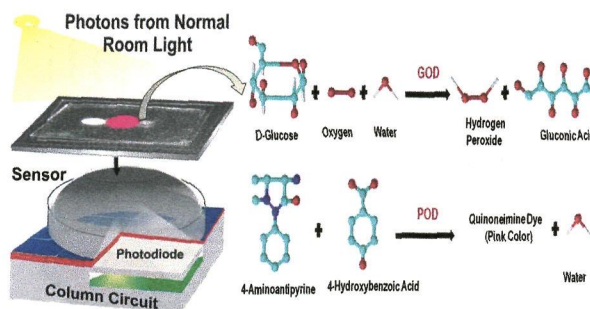


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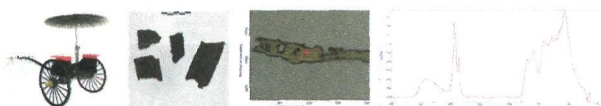
CMOS image sensors as an efficient platform for glucose monitoring

Jasmine Pramila Devadhasan, Sanghyo Kim* and Cheol Soo Choi*

The complementary metal oxide semiconductor image sensor is an efficient platform for glucose monitoring.



5685

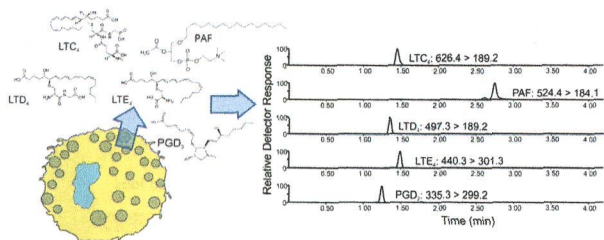


Alteration of Asian lacquer: in-depth insight using a physico-chemical multiscale approach

Anne-Solenn Le Hô,* Chloé Duhamel, Céline Daher, Ludovic Bellot-Gurlet, Céline Paris, Martine Regert, Michel Sablier, Guilhem André, Jean-Paul Desroches and Paul Dumas

A new approach was developed as a probe for alteration of Asian lacquer using SEM, microtopography and SR micro-FTIR.

5697

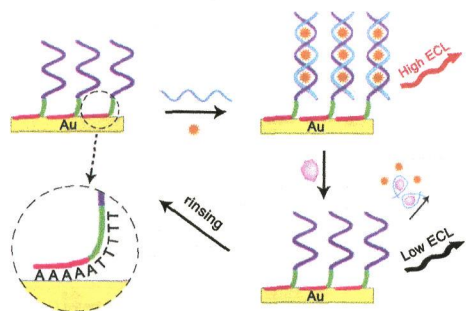


Isotope-dilution UPLC-MS/MS determination of cell-secreted bioactive lipids

Audrey F. Meyer, John W. Thompson, Yiwen Wang, Secil Koseoglu, Joseph J. Dalluge* and Christy L. Haynes*

Secreted bioactive lipids play critical roles in cell-to-cell communication and have been implicated in inflammatory immune responses such as anaphylaxis, vasodilation, and bronchoconstriction.

5706

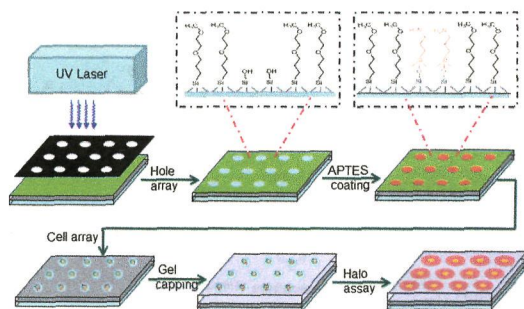


Sensitive and reusable electrochemiluminescent aptasensor achieved with diblock oligonucleotides immobilized solely through preferential adenine–Au interaction

Xiaofeng Tang, Dan Zhao and Meining Zhang*

Adenine and thymine diblock oligonucleotide is used to substitute thiolated-oligonucleotide as an anchor linker to reproducibly construct a general-purpose, sensitive and reusable intercalated electrochemiluminescent aptasensor.

5713



Quantification of metal ion induced DNA damage with single cell array based assay

Yong Qiao and Liyuan Ma*

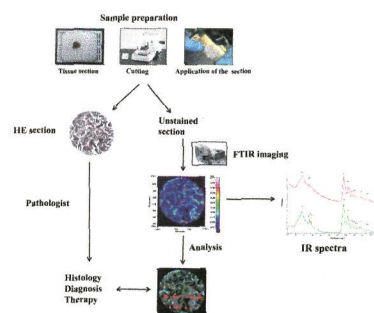
This paper describes a single cell array based method to quantify metal ion induced DNA damage that can potentially be used to predict the response to implanted devices in patients.

5719

Fourier transform infrared imaging analysis in discrimination studies of bladder cancer

C. Pezzei, A. Brunner, G. K. Bonn and C. W. Huck*

Bladder carcinoma represents more than 4% of all cancer diseases in Austria.

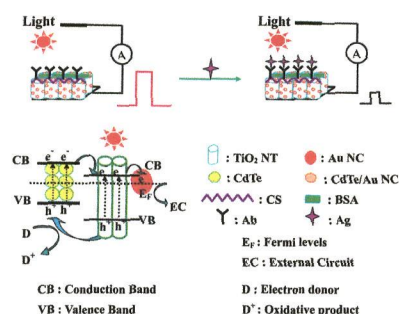


5726

A photoelectrochemical immunosensor for tris(2,3-dibromopropyl) isocyanurate detection with a multiple hybrid CdTe/Au-TiO₂ nanotube arrays

Hui Feng, Liping Zhou, Jiezhen Li, ThanhThuy Tran.T, Niya Wang, Lijuan Yuan, Zhihong Yan and Qingyun Cai*

A tris(2,3-dibromopropyl) isocyanurate photoelectrochemical immunosensor was developed by cross-linking anti-TBC antibody onto a CdTe/Au-TiO₂ nanotube arrays for the first time.

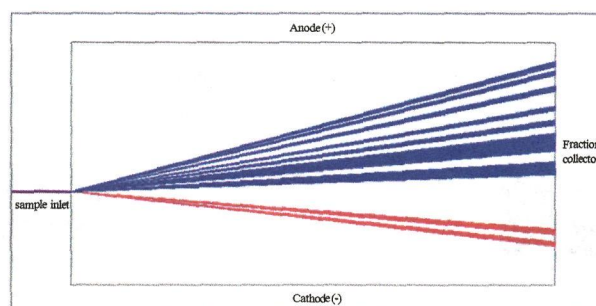


5734

Mathematical model and dynamic computer simulation on free flow zone electrophoresis

Jie Zhang, Jian Yan, Si Li, Bo Pang, Cheng-Gang Guo, Cheng-Xi Cao* and Xin-Qiao Jin

A simulation program was developed to optimize the conditions of FFZE and dynamically display the separation process.

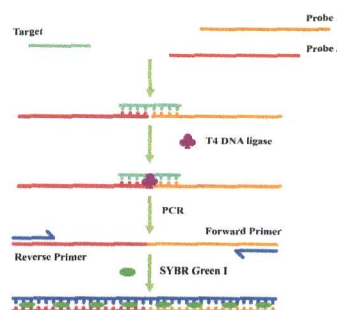


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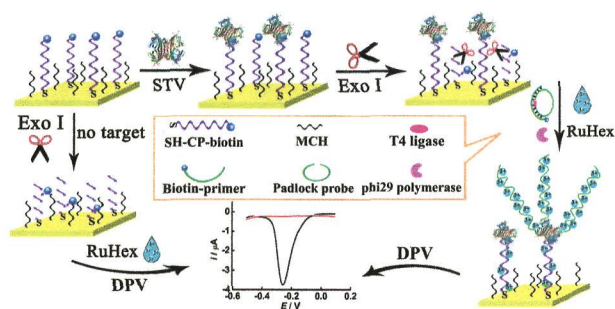
A simple rapid detection method of DNA based on ligation-mediated real-time fluorescence PCR

Yu Qing Du, Peng Fei Gao, Wei Wang, Ting Ting Wang, Yong Chang, Jian Wang* and Cheng Zhi Huang*

We developed a simple and rapid detection method for short length DNA sequences in complicated matrices based on the ligation-mediated polymerase chain reaction. With the specific hybridization of the two probes and target DNA, a target with 16 bases was selectively detected at as low as 200 fM, and the linear range spanned over five orders of magnitude.



5751

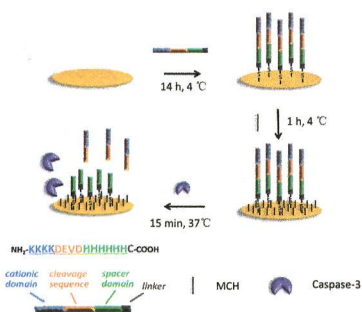


Coupling of background reduction with rolling circle amplification for highly sensitive protein detection via terminal protection of small molecule-linked DNA

Qiong Wang, Bingying Jiang,* Jiaqing Xie, Yun Xiang,* Ruo Yuan and Yaqin Chai

Simultaneous background reduction and signal amplification is achieved in one single assay protocol for the highly sensitive electrochemical detection of proteins.

5757

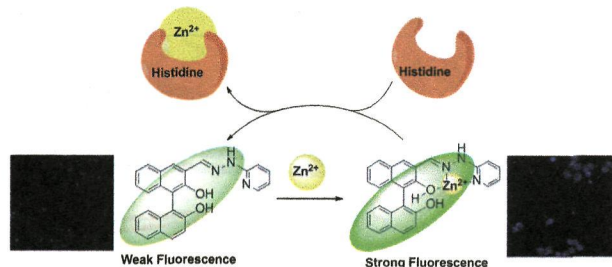


Fabrication of a protease sensor for caspase-3 activity detection based on surface plasmon resonance

Hongxia Chen, Qiaohan Mei, Yafei Hou, Xiaoli Zhu, Kwangnak Koh, Xiaoxi Li and Genxi Li*

Diagnosis of apoptosis is essential to the early detection of therapy efficiency and the evaluation of disease progression.

5762

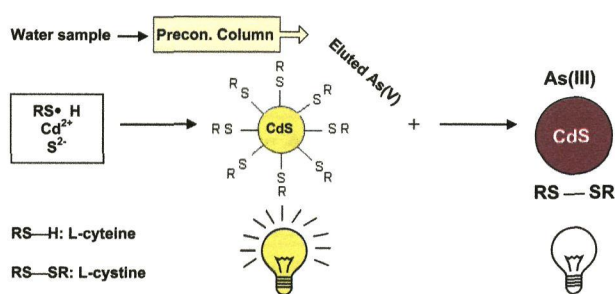


A BINOL-based ratiometric fluorescent sensor for Zn²⁺ and *in situ* generated ensemble for selective recognition of histidine in aqueous solution

Shu-Yan Jiao, Ling-Ling Peng, Kun Li,* Yong-Mei Xie, Mei-Zhen Ao, Xin Wang* and Xiao-Qi Yu*

BINOL-based ratiometric fluorescent sensor which can selectively respond to Zn²⁺ over Cd²⁺ and other metal ions in aqueous solution and *in situ* generated ensemble for histidine detection.

5769

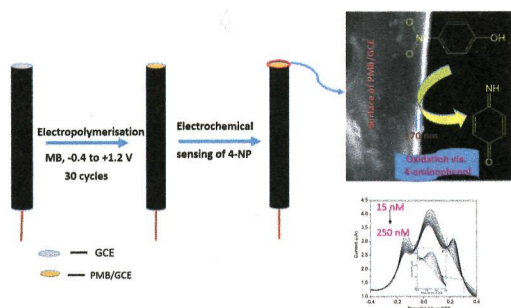


Preconcentration determination of arsenic species by sorption of As(v) on Amberlite IRA-410 coupled with fluorescence quenching of L-cysteine capped CdS nanoparticles

Mohammad Saeid Hosseini* and Sahar Nazemi

Determination of arsenic species is proposed by extraction of As(v) species coupled with fluorescence quenching of L-cysteine capped CdS nanoparticles.

5811

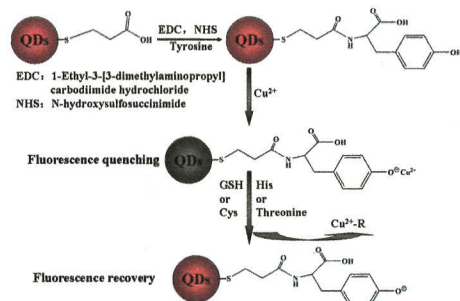


Nanomolar determination of 4-nitrophenol based on a poly(methylene blue)-modified glassy carbon electrode

Krishnamoorthy Giribabu, Ranganathan Suresh, Ramadoss Manigandan, Settu Munusamy, Sivakumar Praveen Kumar, Selvamani Muthamizh and Vengidusamy Narayanan*

A poly(methylene blue)-modified GCE was fabricated by electropolymerisation of MB on GCE and further utilised for the electrochemical determination of 4-NP.

5819

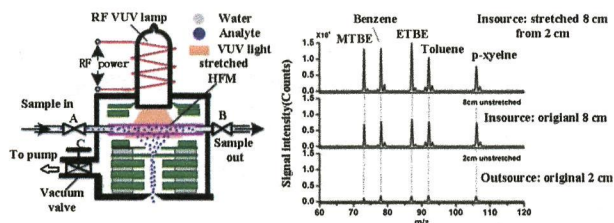


Tyrosine-functionalized CuIn_2S_4 quantum dots as a fluorescence probe for the determination of biothiols, histidine and threonine

Siyu Liu, Fanping Shi, Lu Chen and Xingguang Su*

A novel, rapid and highly sensitive fluorescence turn-on assay for the detection of glutathione, L-cysteine, histidine, and threonine was developed, based on tyrosine-functionalized CuIn_2S_4 quantum dots (QDs).

5826

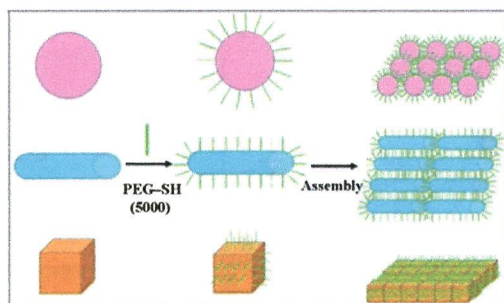


An in-source stretched membrane inlet for on-line analysis of VOCs in water with single photon ionization TOFMS

Keyong Hou, Fanglong Li, Wendong Chen, Ping Chen, Yuanyuan Xie, Wuduo Zhao, Lei Hua, Kemei Pei and Haiyang Li*

A new in-source, stretched, hollow fiber membrane inlet with a VUV lamp-based SPI ion source TOFMS was developed for the on-line analysis of VOCs in water.

5832



Assembly of polymer-gold nanostructures with high reproducibility into a monolayer film SERS substrate with 5 nm gaps for pesticide trace detection

Xia Zhou, Fei Zhou, Honglin Liu, Liangbao Yang* and Jinhuai Liu*

A very simple and versatile polymer assembly approach was developed to form a monolayer film SERS substrate with 5 nm gaps for pesticide trace detection.