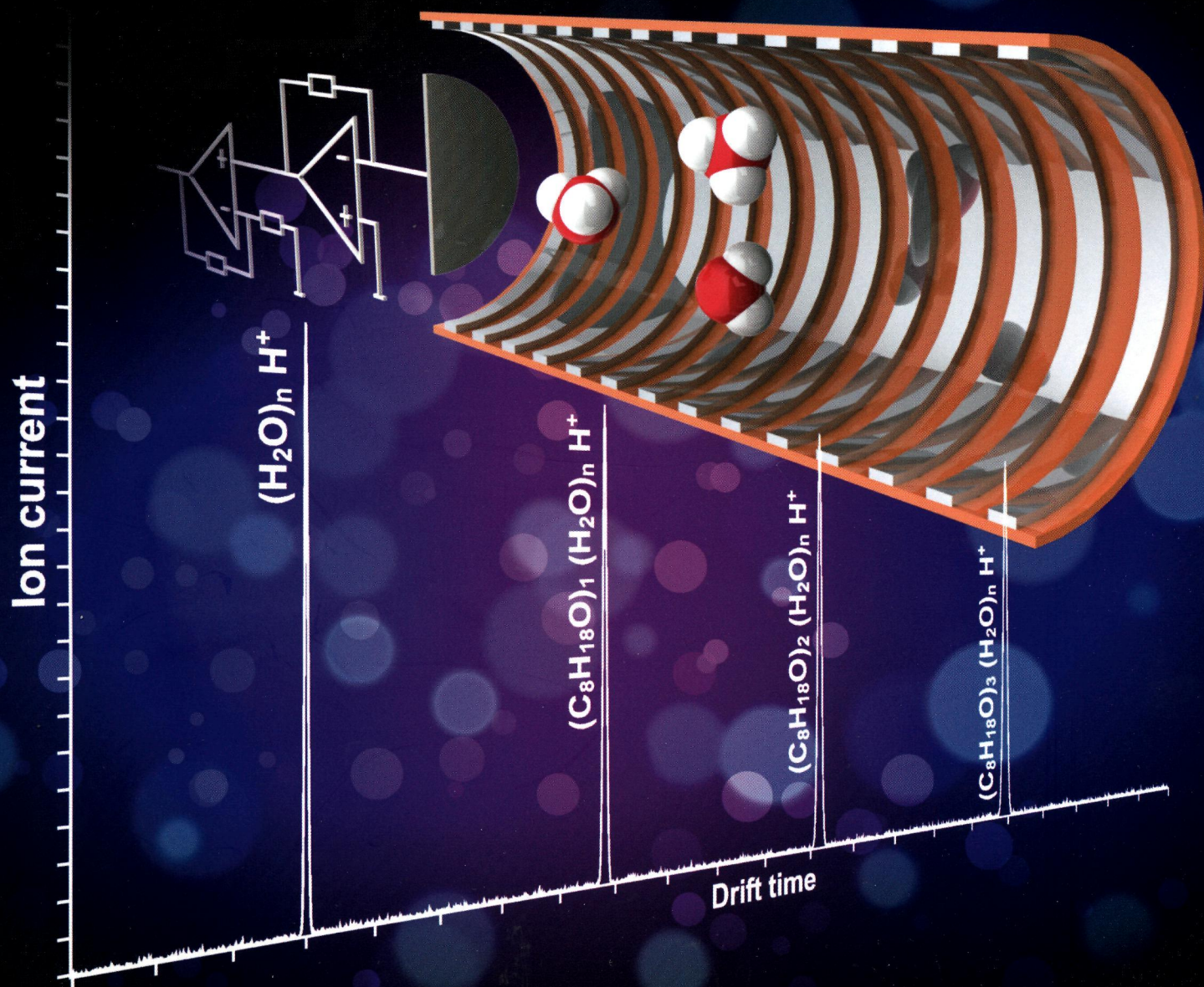


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ISSN 0003-2654

RSC Publishing

HOT PAPER

Ansgar T. Kirk *et al.*

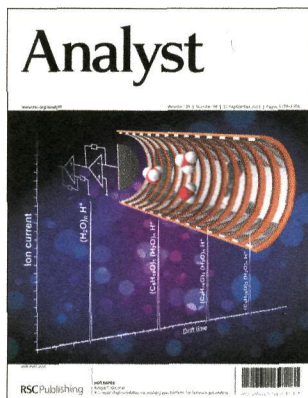
A compact high resolution ion mobility spectrometer for fast trace gas analysis



0003-2654 (2013) 138:18;1-T

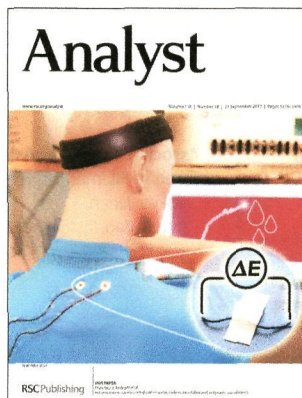
IN THIS ISSUE

ISSN 0003-2654 CODEN ANALAO 138(18) 5159–5504 (2013)



Cover

See Ansgar T. Kirk *et al.*, pp. 5200–5207.
Image reproduced by permission of Stefan Zimmermann from *Analyst*, 2013, **138**, 5200.



Inside cover

See Francisco J. Andrade *et al.*, pp. 5208–5215.
Image reproduced by permission of Francisco J. Andrade from *Analyst*, 2013, **138**, 5208.

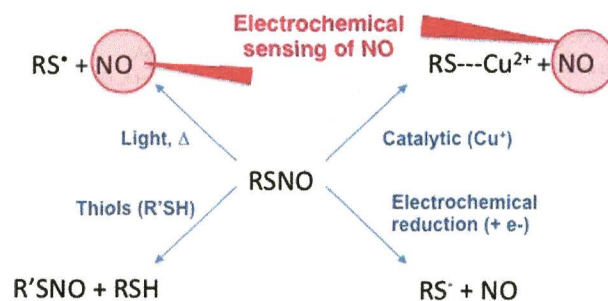
CRITICAL REVIEW

5173

Electroanalytical methodologies for the detection of S-nitrosothiols in biological fluids

Sophie Griveau* and Fethi Bedioui*

The interest in the detection and quantification of S-nitrosothiols or thionitrites RSNOs in biological media and their use as pharmaceutical agents is mainly related to the discovery of nitric oxide as an endothelium relaxing factor, and analytical methodologies that are able to detect these moieties in real time, *in situ* and ideally with high sensitivity and selectivity could help in a better understanding of their biological pathways.



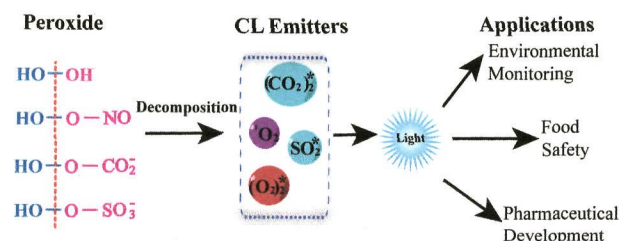
TUTORIAL REVIEW

5182

Peroxide induced ultra-weak chemiluminescence and its application in analytical chemistry

Zhen Lin, Hui Chen and Jin-Ming Lin*

A review paper on the mechanism and analytical applications of peroxide induced ultra-weak chemiluminescence.

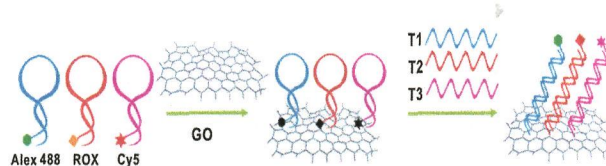


5194

Multicolour probes for sequence-specific DNA detection based on graphene oxide

Qing Zhu, Dongshan Xiang, Cuiling Zhang, Xinghu Ji* and Zhike He*

A new strategy was established for multiple oligonucleotide target detection with three dye-labeled nucleic acid probes and graphene oxide.



5197

Kaajal fights against eye pathogens and is safe for eye make-up: a reinvestigation of an ancient practice

Santi M. Mandal,* Suman Saha, Jayangshu Sengupta and Sanjay Pratihari*

The present report includes a scientific view of the traditional use of 'Kaajal' from the leaf of *Euphorbia neriifolia*, an Indian spurge tree locally called the 'Monosha' plant.



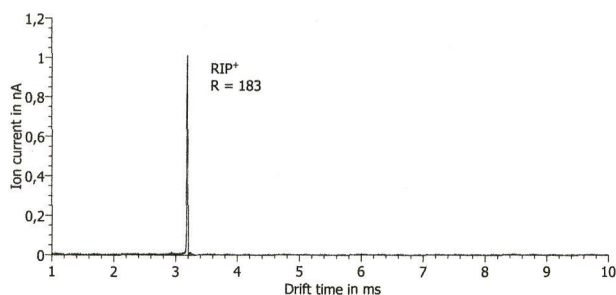
PAPERS

5200

A compact high resolution ion mobility spectrometer for fast trace gas analysis

Ansgar T. Kirk,* Maria Allers, Philipp Cochems, Jens Langejuergen and Stefan Zimmermann

Based on a refined theory of IMS operation, a 10 cm short drift tube ion mobility spectrometer with a resolution of 183 and detection limits in the low ppt_v-range has been designed.

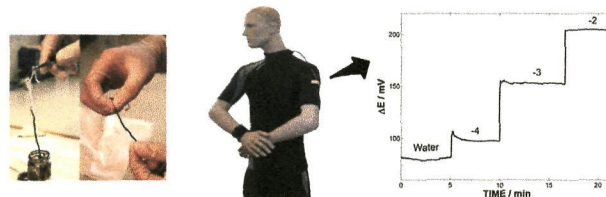


5208

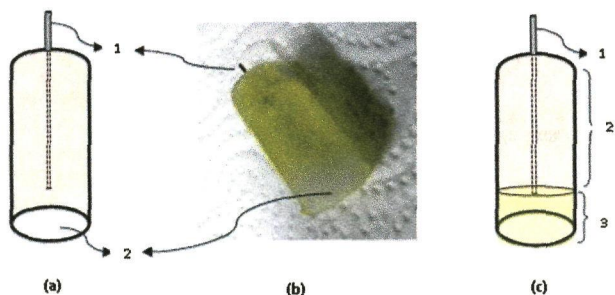
Potentiometric sensors using cotton yarns, carbon nanotubes and polymeric membranes

Tomàs Guinovart, Marc Parrilla, Gastón A. Crespo, F. Xavier Rius and Francisco J. Andrade*

A simple and generalized approach to build electrochemical sensors for wearable devices is presented.



5216

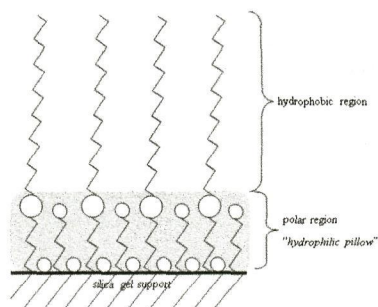


An analytical quality solid-state composite reference electrode

Zekra Mousavi, Kim Granholm, Tomasz Sokalski* and Andrzej Lewenstam

A new type of all-solid-state reference electrode was designed and characterized.

5221

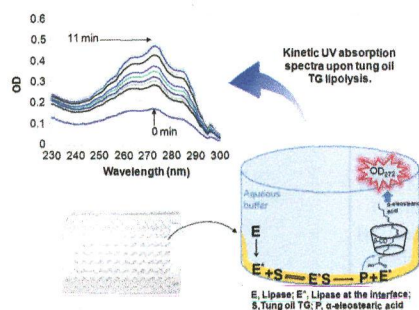


Characterization of new *N,O*-dialkyl phosphoramidate-bonded stationary phases for reversed-phase HPLC – retention and selectivity

Szymon Bocian, Magdalena Paca and Bogusław Buszewski*

The chromatographic properties of new *N,O*-dialkyl phosphoramidate stationary phases were studied.

5230

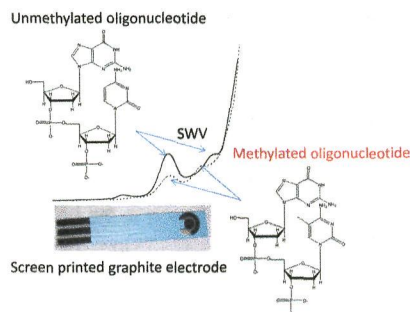


Development of a high-throughput assay for measuring lipase activity using natural triacylglycerols coated on microtiter plates

Carole Serveau-Avesque, Robert Verger, Jorge A. Rodriguez and Abdelkarim Abousalham*

We have designed a convenient, specific, sensitive and continuous lipase assay based on the use of natural triacylglycerols (TAGs) from the *Aleurites fordii* seed oil which contains α -eleostearic acid and which was coated in the wells of microtiter plates.

5239



Voltammetric behaviour of free DNA bases, methylcytosine and oligonucleotides at disposable screen printed graphite electrode platforms

Ariadna Brotons, Luis Alcaraz Mas, Jonathan P. Metters, Craig E. Banks and Jesús Iniesta*

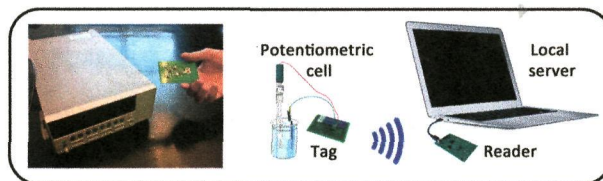
SPGEs were used to study the electrochemical response of all free DNA bases, methylcytosine and short oligonucleotides by CV and SWV.

5250

A novel miniaturized radiofrequency potentiometer tag using ion-selective electrodes for wireless ion sensing

Marta Novell, Tomàs Guinovart, Ivana Murković Steinberg, Matthew Steinberg, F. Xavier Rius and Francisco J. Andrade*

A novel, miniaturized wireless potentiometric sensing tag coupled to solid-state ion-selective electrodes.

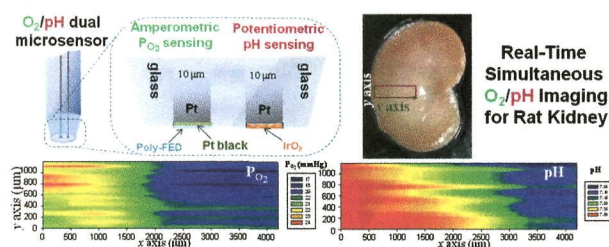


5258

A dual electrochemical microsensor for simultaneous imaging of oxygen and pH over the rat kidney surface

Yejin Ha, Dongshin Myung, Jun Ho Shim, Myung Hwa Kim and Youngmi Lee*

Location-dependent O_2 /pH levels of a rat kidney are imaged simultaneously using a dual amperometric/potentiometric O_2 /pH microsensor.

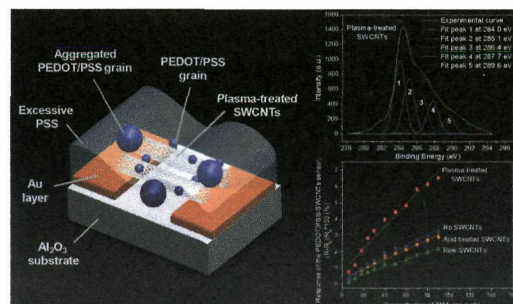


5265

O_2 plasma-functionalized SWCNTs and PEDOT/PSS composite film assembled by dielectrophoresis for ultrasensitive trimethylamine gas sensor

Xishan Guo,* Jinming Jian, Liwei Lin, Hanyu Zhu and Songming Zhu

Dielectrophoretically assembled composite film of oxygen plasma-treated SWCNTs and PEDOT/PSS polymer showed extremely high sensitivity, fast response and good stability to trimethylamine gas at the ppb level.

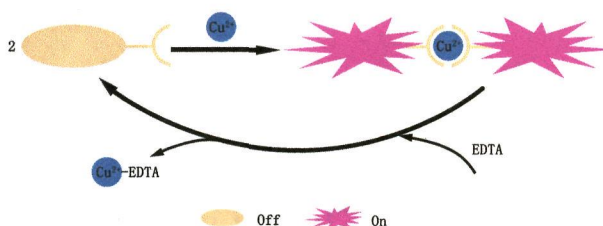


5274

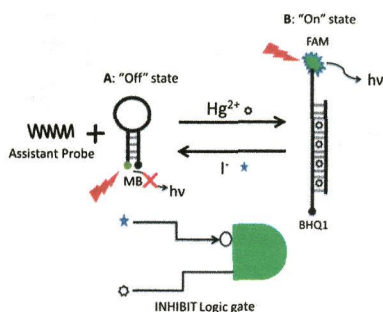
Determination of trace amount of Cu^{2+} with a multi-responsive colorimetric and reversible chemosensor

Yong-Sheng Mi, Zhong Cao,* Ya-Ting Chen, Qiu-Fen Xie, Ying-Ying Xu, Yong-Feng Luo, Jian-Jian Shi and Jian-Nan Xiang*

A multi-signal and reversible chemosensor based on a rhodamine-ferrocene Schiff base was constructed for the determination of trace amount of Cu^{2+} ions.



5281

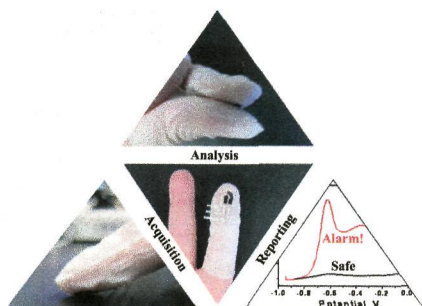


A reversible fluorescent logic gate for sensing mercury and iodide ions based on a molecular beacon

Xu Wu, Jiao Chen and Julia Xiaojun Zhao*

A reversible fluorescent logic gate was developed for the detection of Hg^{2+} and I^- based on a molecular beacon.

5288

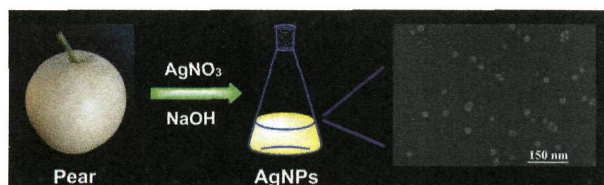


Solid-state Forensic Finger sensor for integrated sampling and detection of gunshot residue and explosives: towards 'Lab-on-a-finger'

Amay J. Bandodkar, Aoife M. O'Mahony, Julian Ramírez, Izabela A. Samek, Sean M. Anderson, Joshua R. Windmiller and Joseph Wang*

The article demonstrates the fabrication and characterization of a wearable all-solid-state fingertip sensor for rapid on-site screening of explosives and gunshot residues.

5296

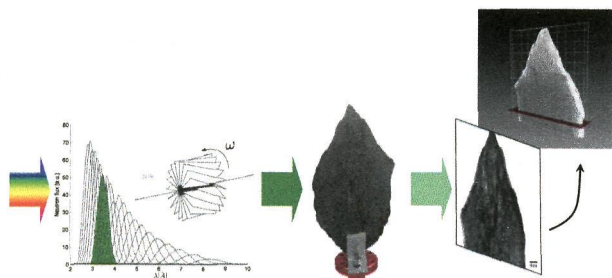


A simple green route to prepare stable silver nanoparticles with pear juice and a new selective colorimetric method for detection of cysteine

Jing Tao Huang, Xiao Xi Yang, Qiao Ling Zeng and Jian Wang*

In this work, a new cost-effective, rapid and simple method for the preparation of stable silver nanoparticles (AgNPs) was developed, which can be completed within 15 minutes at room temperature by oxidizing the reductants in pear juice with AgNO_3 .

5303



Energy-selective neutron imaging for morphological and phase analysis of iron–nickel meteorites

S. Peetermans,* F. Grazzi, F. Salvemini, E. H. Lehmann, S. Caporali and G. Pratesi

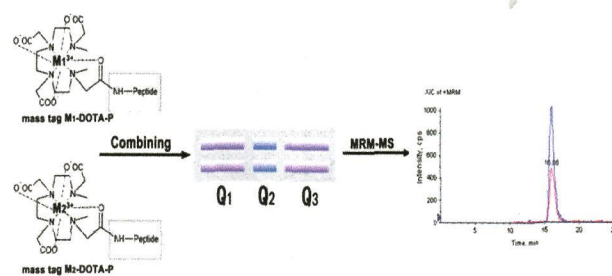
Energy-selective neutron imaging was applied for the first time for non-destructive evaluation of the bulk morphology and orientation of mineral inclusions, oxide crust and crystallites in rare iron–nickel meteorites.

5309

Metal-tag labeling coupled with multiple reaction monitoring-mass spectrometry for absolute quantitation of proteins

Xueying Wang, Xin Wang, Weijie Qin, Hongjun Lin, Jifeng Wang, Junying Wei, Yangjun Zhang* and Xiaohong Qian*

A method of metal-tag labeling of peptides as internal standards coupled with MRM-MS for absolute quantification of proteins was developed.

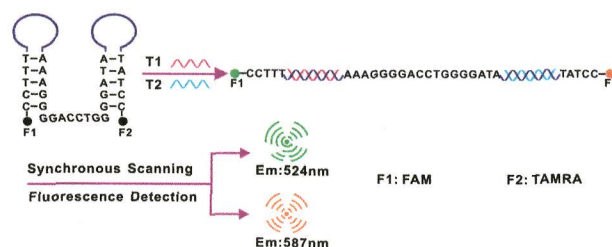


5318

Multiplexed DNA detection with a composite molecular beacon based on guanine-quenching

Dong-Shan Xiang,* Kun Zhai and Lian-Zhi Wang

We developed a multiplexed DNA detection method with a composite molecular beacon probe based on guanine-quenching by synchronous fluorescence analysis.

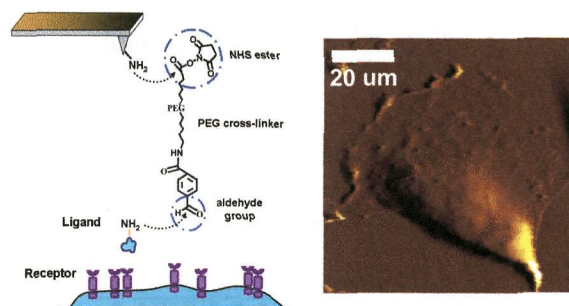


5325

Single molecular dissection of the ligand binding property of epidermal growth factor receptor

Jing Zhang, Huiqing Liu, Rong Zhu, Peter Hinterdorfer, Bailin Zhang* and Jilin Tang*

The binding properties of EGFR to EGF and TGF- α were investigated on T24 cell surface at single-molecule level.

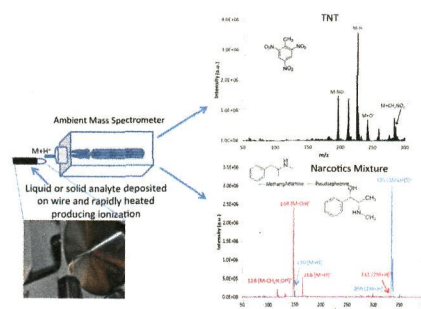


5332

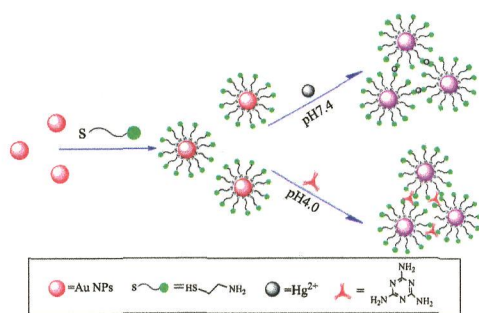
Ambient pressure thermal desorption ionization mass spectrometry for the analysis of substances of forensic interest

Leonard T. Demoranville* and Tim M. Brewer

Ambient pressure thermal desorption ionization mass spectrometry is presented as an analytical tool which could possibly provide high-throughput identification and analysis of forensic samples.



5338

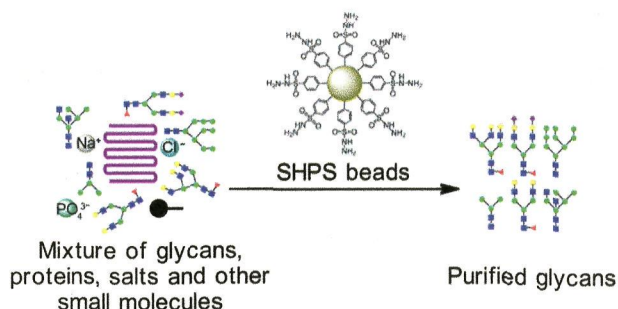


Colorimetric sensing strategy for mercury(II) and melamine utilizing cysteamine-modified gold nanoparticles

Yujie Ma, Ling Jiang, Yajun Mei, Rongbin Song, Danbi Tian* and He Huang

A quantitative colorimetric sensing strategy for Hg^{2+} as well as melamine was proposed utilizing cysteamine modified gold nanoparticles.

5344

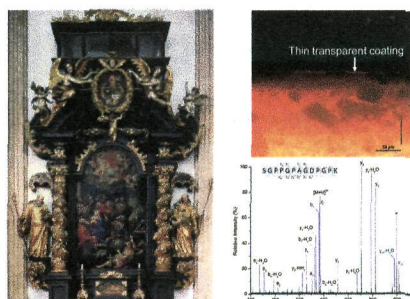


Sulfonyl hydrazine-functionalized polymer as a specific capturer of reducing glycans from complex samples for high-throughput analysis by electrospray ionization mass spectrometry

Chengjian Wang, Jiangbei Yuan, Xiaohua Li, Zhongfu Wang* and Linjuan Huang*

Quantitative isolation of reducing glycans from complex sample mixtures using sulfonyl hydrazine-functionalized polystyrene beads based on reversible hydrazone chemistry.

5357

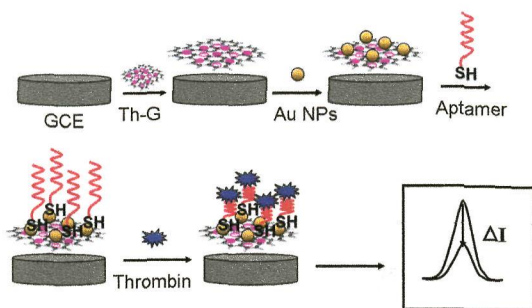


Proteomics applied to the authentication of fish glue: application to a 17th century artwork sample

Sophie Dallongeville, Mark Richter, Stephan Schäfer, Michael Kühlenenthal, Nicolas Garnier, Christian Rolando and Caroline Tokarski*

This work provides the first identification of fish glue from a few micrograms of a 17th century polychromy sample using an adapted proteomics approach.

5365



Aptamer-linked biosensor for thrombin based on AuNPs/thionine-graphene nanocomposite

Zhao Zhang, Liqiang Luo,* Limei Zhu, Yaping Ding, Dongmei Deng and Zhenxin Wang*

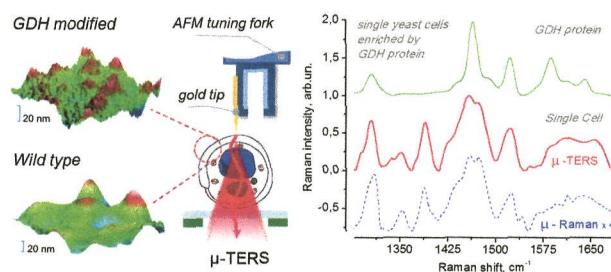
The ethanethiol-substituted oligonucleotide probe was immobilized onto a AuNPs/Th-G nanocomposite for an electrochemical thrombin aptasensor.

5371

***In vivo* characterization of protein uptake by yeast cell envelope: single cell AFM imaging and μ -tip-enhanced Raman scattering study**

Denys Naumenko, Valentinas Snitka, Elena Serviene, Ingrida Bruzaite and Boris Snopok*

The advanced combination of AFM imaging and subsurface chemical characterization by novel μ -tip-enhanced Raman spectroscopy provides a unique analytical tool for investigation of single living cells *in vivo*.

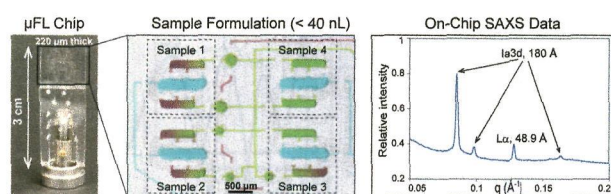


5384

An X-ray transparent microfluidic platform for screening of the phase behavior of lipidic mesophases

Daria S. Khvostichenko, Elena Kondrashkina, Sarah L. Perry, Ashtamurthy S. Pawate, Keith Brister and Paul J. A. Kenis*

We developed an X-ray transparent microfluidic platform with active mixing capabilities for the formulation of highly viscous lipidic mesophases and *in situ* analysis of their microstructure by small-angle X-ray scattering.

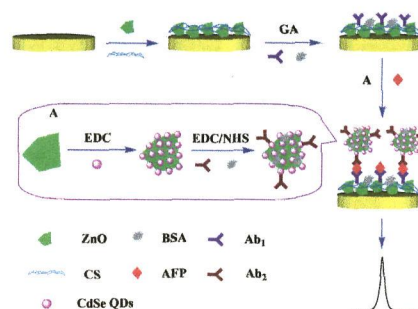


5396

Dual signal amplification of zinc oxide nanoparticles and quantum dots-functionalized zinc oxide nanoparticles for highly sensitive electrochemiluminescence immunosensing

Jinxing Zhang, Suli Liu, Jianchun Bao, Wenwen Tu* and Zhihui Dai*

A novel electrochemiluminescence immunosensor based on dual signal amplification of ZnO nanoparticles and CdSe QDs-functionalized ZnO nanoparticles has been developed.

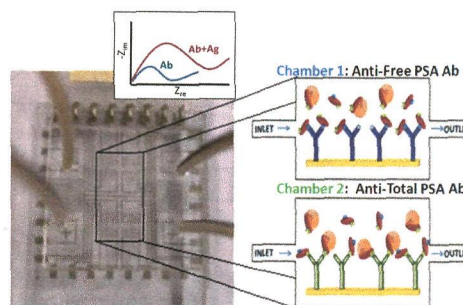


5404

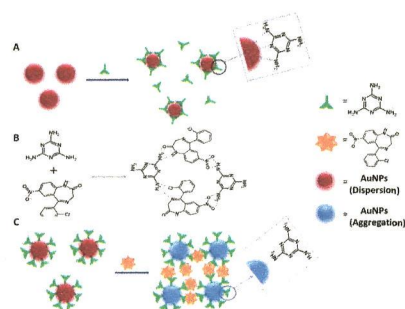
On-chip screening for prostate cancer: an EIS microfluidic platform for contemporary detection of free and total PSA

Maria Serena Chiriaco*, Elisabetta Primiceri, Alessandro Montanaro, Francesco de Feo, Lorenzo Leone, Ross Rinaldi and Giuseppe Maruccio*

A low-cost impedimetric platform for on-chip early detection of prostate cancer has been developed, able to perform a label-free and time-saving test for free-to-total PSA ratio.



5411

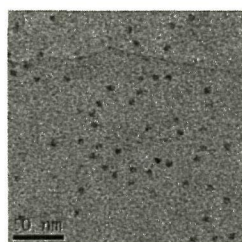


Melamine modified gold nanoprobe for "on-spot" colorimetric recognition of clonazepam from biological specimens

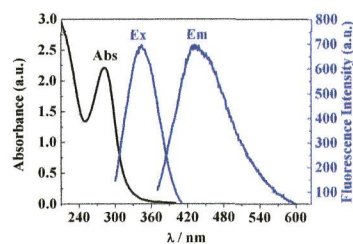
Anand Lodha, Alok Pandya, Pinkesh G. Sutariya and Shobhana K. Menon*

Here we report a highly sensitive, selective and cost effective method based on gold nanoparticles for the detection of trace amounts of clonazepam up to 8.9×10^{-10} M in the presence of melamine from blood and skeletal remains.

5417



A



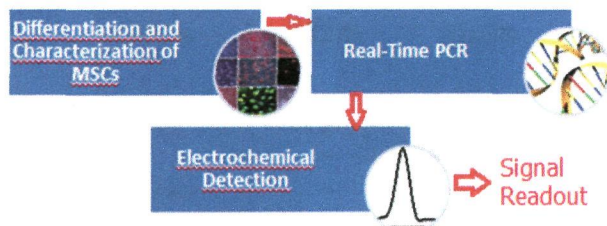
B

Carbon dots and chitosan composite film based biosensor for the sensitive and selective determination of dopamine

Qitong Huang, Shirong Hu,* Hanqiang Zhang, Jianhua Chen, Yasan He, Feiming Li, Wen Weng, Jiancong Ni, Xiuxiu Bao and Yi Lin

A simple, sensitive and reliable dopamine (DA) biosensor was developed based on a carbon dots (CDs) and chitosan (CS) composite film modified glassy carbon electrode (CDs-CS/GCE).

5424

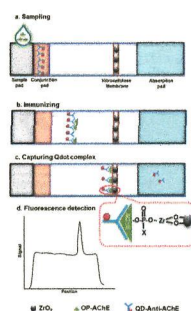


Genomagentic assay for electrochemical detection of osteogenic differentiation in mesenchymal stem cells

Arzum Erdem,* Gokhan Duruksu, Gulsah Congur and Erdal Karaoz*

The osteogenic differentiation of mesenchymal stem cells was assessed by determining the gene expression levels of proteins; osteocalcin, osteonectin and osteopontin based on electrochemical detection protocol combined with genomagentic assay in parallel with real-time PCR analysis.

5431



Nanoparticle-based immunochromatographic test strip with fluorescent detector for quantification of phosphorylated acetylcholinesterase: an exposure biomarker of organophosphorus agents

Weiyang Zhang, Xiaoxiao Ge, Yong Tang, Dan Du, Deli Liu* and Yuehe Lin*

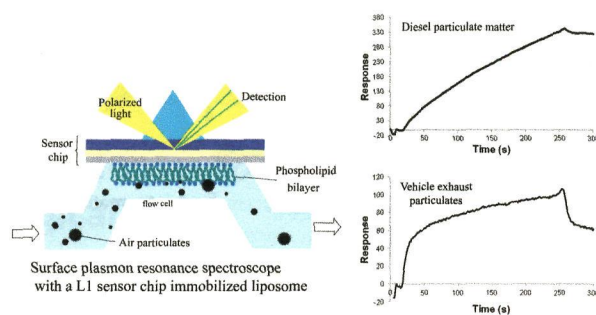
A nanoparticle-based fluorescence immunochromatographic test strip (FITS) coupled with a hand-held detector for highly selective and sensitive detection of phosphorylated acetylcholinesterase (AChE) is reported.

5437

Development of a novel evaluation method for air particles using surface plasmon resonance spectroscopy analysis

Ryoya Tanaka, Ryusaku Gomi, Kunihiro Funasaka, Daichi Asakawa, Hiromitsu Nakanishi and Hiroshi Moriwaki*

Surface plasmon resonance spectroscopy analysis using a sensor chip immobilized liposome was applied to the evaluation and characterization of air particles.

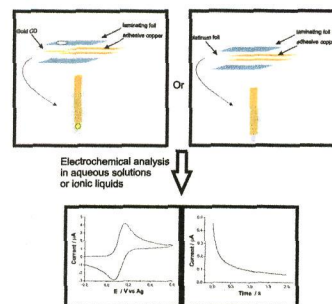


5444

Fabrication of disposable gold macrodisc and platinum microband electrodes for use in room-temperature ionic liquids

Linhongjia Xiong, Denise Lowinsohn, Kristopher R. Ward and Richard G. Compton*

We report a simple and facile methodology for constructing gold macrodisc and platinum microband electrodes for use in room temperature ionic liquids (RTILs).

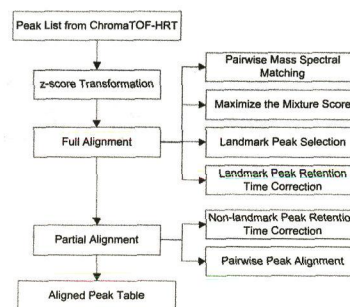


5453

A method of aligning peak lists generated by gas chromatography high-resolution mass spectrometry

Xiaoli Wei, Xue Shi, Mark Merrick, Peter Willis, David Alonso and Xiang Zhang*

We report a method for the peak list alignment of gas chromatography high resolution time-of-flight mass spectrometry data. The alignment is performed in a z-score transformed retention time domain. A mixture score is developed to assess the similarity between two peaks by simultaneously evaluating the mass spectral similarity and the closeness of retention time.

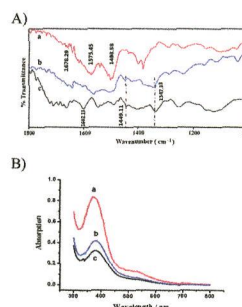


5461

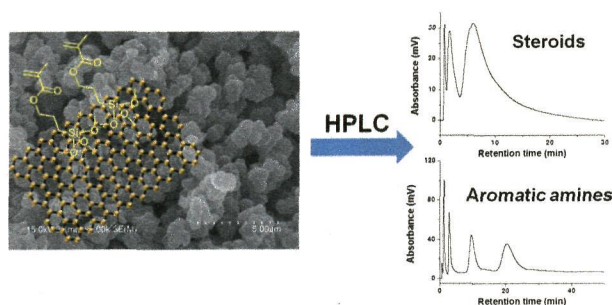
Double recognition of dopamine based on a boronic acid functionalized poly(aniline-co-anthranilic acid)-molecularly imprinted polymer composite

Li Gu, Xiaoying Jiang, Ying Liang, Tianshu Zhou* and Guoyue Shi*

In this work, we report a competitive sensor performing "double recognition" for the specific capture of dopamine (DA) with the combination of boronic acid functional groups and molecularly imprinted cavities based on poly(aniline-co-anthranilic acid) (PANANA) as the support material.



5470

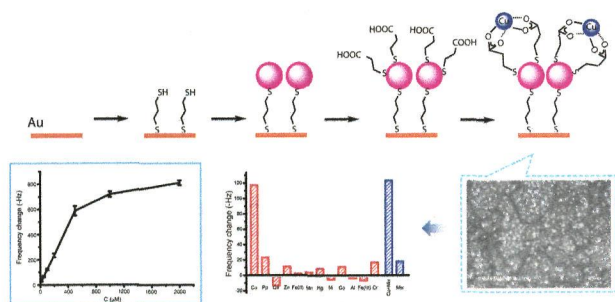


Preparation of porous polymer monolithic column using functionalized graphene oxide as a functional crosslinker for high performance liquid chromatography separation of small molecules

Yaping Li, Li Qi* and Huimin Ma

Functionalized graphene oxide has been copolymerized into porous polymer monolith as a functional crosslinker and afforded the monolith column with enhanced HPLC performance for separation of small molecules in an isocratic mode.

5479

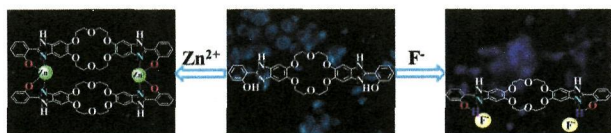


Gold nanoparticle-sensitized quartz crystal microbalance sensor for rapid and highly selective determination of Cu(II) ions

Yulong Jin, Yanyan Huang,* Guoquan Liu and Rui Zhao*

A gold nanoparticle-sensitized quartz crystal microbalance sensor was developed for rapid, selective and sensitive detection of Cu²⁺ in real samples.

5486

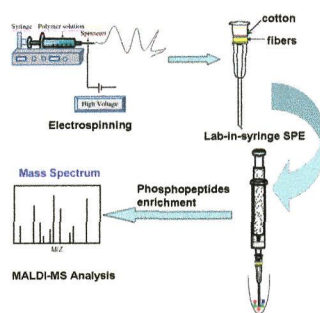


A new ditopic ratiometric receptor for detecting zinc and fluoride ions in living cells

Ya-Ping Li, Qiang Zhao, Hua-Rong Yang, Sui-Jun Liu, Xiu-Ming Liu, Ying-Hui Zhang, Tong-Liang Hu, Jia-Tong Chen, Ze Chang* and Xian-He Bu*

A new ratiometric fluorescent receptor **1**, which can recognize Zn²⁺ and F⁻ in living cells with different fluorescent colour changes, was successfully designed and synthesized. The sensing processes were monitored by the fluorescence/absorption titrations, and further confirmed by Job's plot, DFT calculations, X-ray crystallography and ¹H NMR titrations.

5495



Rapid enrichment of phosphopeptides by SiO₂-TiO₂ composite fibers

Xiao-Mei He, Gang-Tian Zhu, Xiao-Shui Li, Bi-Feng Yuan, Zhi-Guo Shi and Yu-Qi Feng*

SiO₂-TiO₂ composite fibers, prepared by electrospinning, were successfully applied to the rapid enrichment of phosphopeptides for the first time.