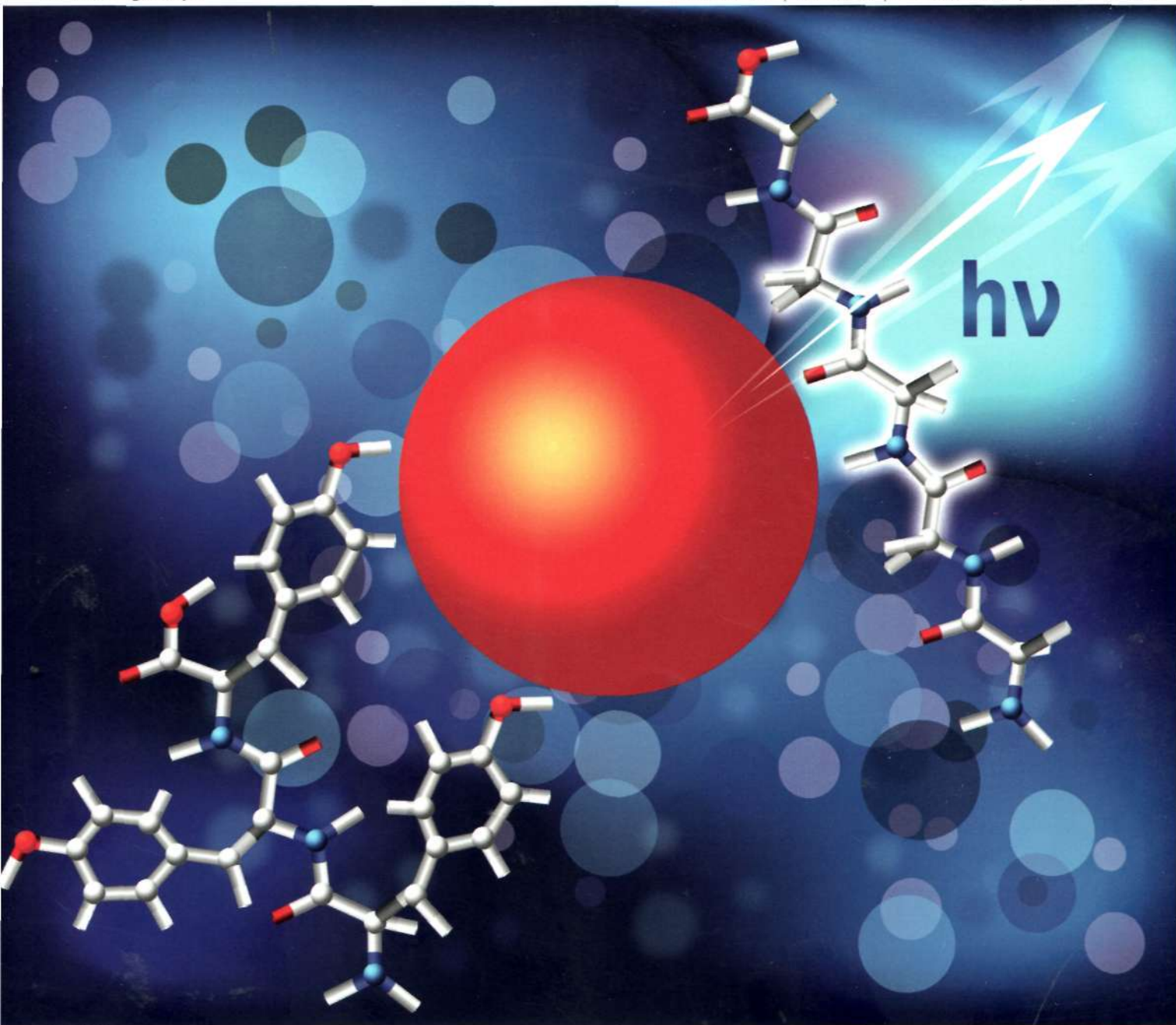


114
A 53/2

Analyst

www.rsc.org/analyst

Volume 138 | Number 6 | 21 March 2013 | Pages 1605–1910



ISSN 0003-2654

RSC Publishing

PAPER

Igor K. Lednev *et al.*
Amide I vibrational mode suppression in surface (SERS) and tip (TERS)
enhanced Raman spectra of protein specimens



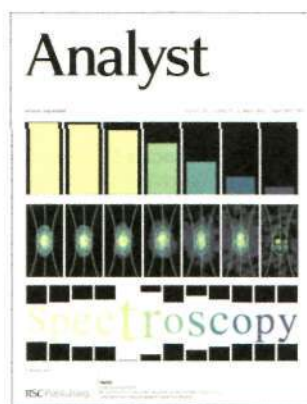
0003-2654(2013)138:6:1-D

IN THIS ISSUE

ISSN 0003-2654 CODEN ANALAO 138(6) 1605–1910 (2013)



Cover
See Igor K. Lednev *et al.*, pp. 1665–1673.
Image generated by Aliaksandra Sikirzhitskaya.
Image reproduced by permission of Igor K. Lednev from *Analyst*, 2013, **138**, 1665.



Inside cover
See Luigi Sanguigno *et al.*, pp. 1674–1681.
Image reproduced by permission of Luigi Sanguigno from *Analyst*, 2013, **138**, 1674.

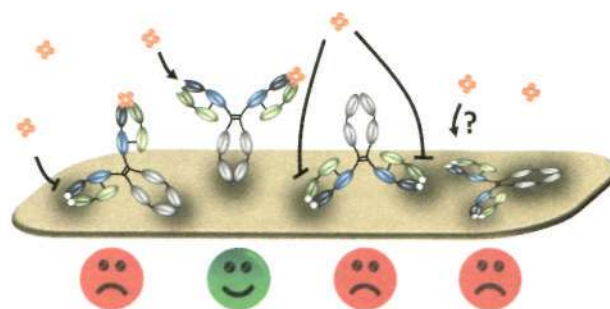
MINIREVIEW

1619

Antibody orientation on biosensor surfaces: a minireview

Anke K. Trilling, Jules Beekwilder and Han Zuilhof*

This review outlines methods to orient antibodies onto a surface, to study their orientation, and the significant effects of orientation on biosensing.



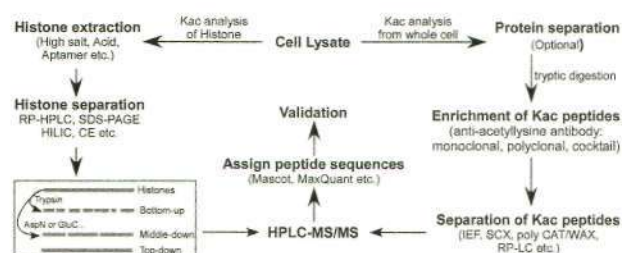
CRITICAL REVIEW

1628

Protein lysine acetylation analysis: current MS-based proteomic technologies

Kai Zhang, * Shanshan Tian and Enguo Fan*

Current strategies employed to identify protein lysine acetylation, which is involved in a broad array of physiological functions, are summarized.



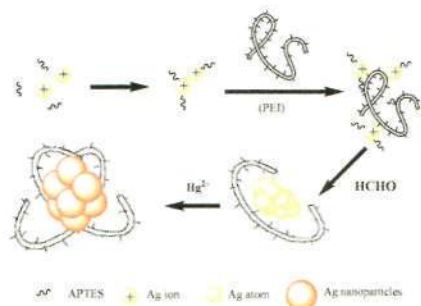
Федеральное государственное
бюджетное учреждение науки
Центральная научная библиотека
Уральского отделения
Российской академии наук (ЦНБ УрСибРАН)

1637

Localized surface plasmon resonance light-scattering detection of Hg(II) with 3-aminopropyltriethoxysilane-assisted synthesis of highly stabilized Ag nanoclusters

Jingjing Zhu, Qinli Mao, Lang Gao, Yu He* and Gongwu Song

3-Aminopropyltriethoxysilane was employed to assist the synthesis of Ag NCs using polyethyleneimine as the template for detecting Hg²⁺ by localized surface plasmon resonance light-scattering technology.

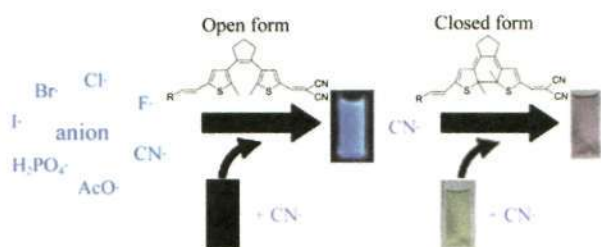


1641

Near-infrared photochromic behavior in a donor-acceptor type diarylethene modulated by the cyanide anion

Jiayu Jin, Junji Zhang, Lei Zou and He Tian*

Two novel near-infrared photochromic compounds, containing a donor and an acceptor for the detection of cyanide anions, have been developed.

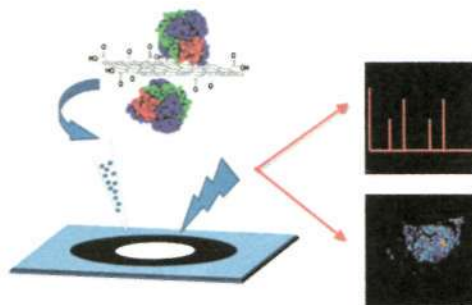


1645

Realization of on-tissue protein identification by highly efficient *in situ* digestion with graphene-immobilized trypsin for MALDI imaging analysis

Jing Jiao, Aizhu Miao, Xinyan Zhang, Yan Cai, Yi Lu, Ying Zhang* and Haojie Lu*

Spatial distribution of proteins and their identification are simultaneously obtained by highly efficient on-tissue digestion with GO-IMER combined imaging MS.

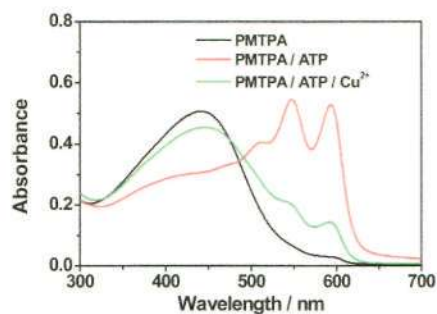


1649

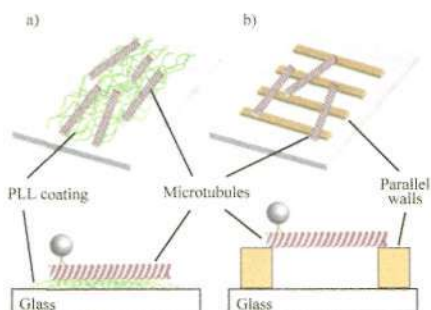
Colorimetric detection of copper ions based on a supramolecular complex of water-soluble polythiophene and ATP

Zhiyi Yao, Binghuan Huang, Xianping Hu, Li Zhang, Depeng Li, Ming Guo, Xiaohui Zhang, Hui Yuan and Hai-Chen Wu*

A colorimetric probe for the detection of copper(II) ions in aqueous media by the naked eye has been developed based on a supramolecular complex comprised of a cationic polythiophene derivative and ATP with a detection limit as low as 0.05 mM.



1653

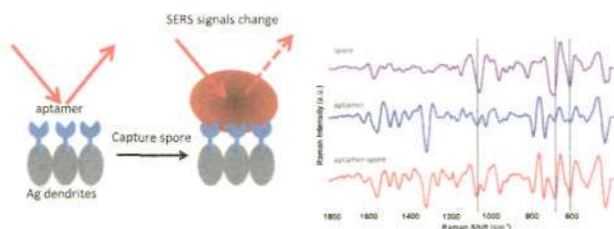


Suspended microtubules demonstrate high sensitivity and low experimental variability in kinesin bead assay

Mehmet C. Tarhan,* Yslam Orazov, Ryuji Yokokawa, Stanislav L. Karsten and Hiroyuki Fujita*

A new microtubule-based assay configuration, *i.e.* suspended microtubules, for bead assay based motor protein systems is described.

1657

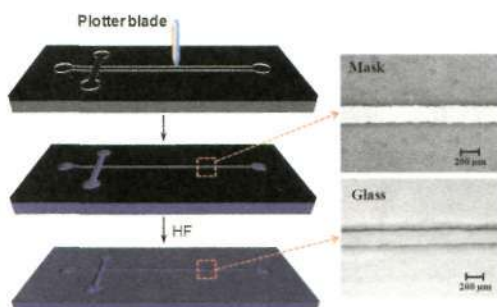


Concentration, detection and discrimination of *Bacillus anthracis* spores in orange juice using aptamer based surface enhanced Raman spectroscopy

Lili He, Bronwyn D. Deen, Alyssa H. Pagel, Francisco Diez-Gonzalez and Theodore P. Labuza*

Bacillus anthracis spores were captured by aptamer conjugated silver dendrites and identified using label free surface enhanced Raman scattering detection.

1660



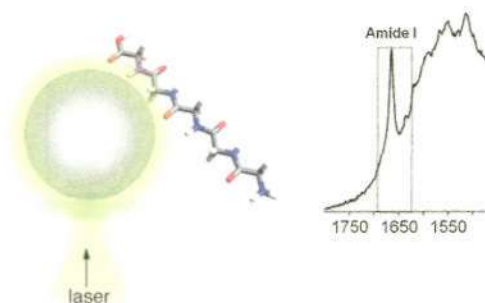
Fabrication of glass microchannels by xurography for electrophoresis applications

Phillipe Pessoa de Santana, Thiago Pinotti Segato, Emanuel Carrilho, Renato Sousa Lima, Nicolò Dossi, Marcos Yassuo Kamogawa, Angelo Luiz Gobbi, Maria Helena Piazzeta and Evandro Piccin*

A simple and cost-effective method was developed for fabricating microchannels in glass using xurography combined with wet chemical etching.

PAPERS

1665



Amide I vibrational mode suppression in surface (SERS) and tip (TERS) enhanced Raman spectra of protein specimens

Dmitry Kurouski, Thomas Postiglione, Tanja Deckert-Gaudig, Volker Deckert and Igor K. Lednev*

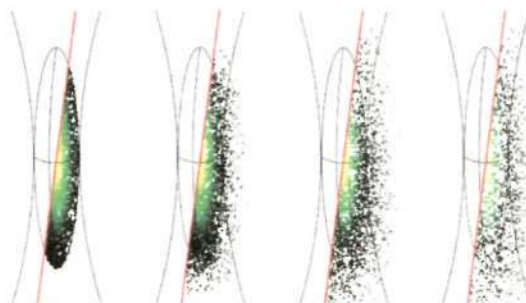
The presence or absence of the amide I band in SERS or TERS spectra collected from protein specimens is a matter of the peptide bond proximity to the surface of a metal nano-particle.

1674

Accounting for misalignments and thermal fluctuations in fluorescence correlation spectroscopy experiments on membranes

Luigi Sanguigno,* Chiara Cosenza, Filippo Causa and Paolo Antonio Netti

Theoretical elucidation of the autocorrelation function aberrations due to misalignments and thermal fluctuations occurring in fluorescence correlation spectroscopy experiments on arbitrarily oriented membranes.

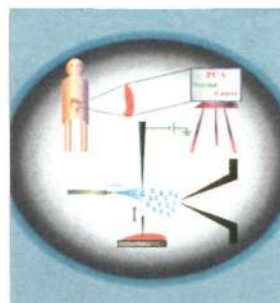


1682

Biomolecular analysis and cancer diagnostics by negative mode probe electrospray ionization

Mridul Kanti Mandal,* Subhrakanti Saha, Kentaro Yoshimura, Yasuo Shida, Sen Takeda, Hiroshi Nonami and Kenzo Hiraoka*

We have examined several combinations of solvents and probes with the aim of optimizing the ionization conditions for biomolecules e.g., proteins, peptides and lipids by negative mode probe electrospray ionization mass spectrometry (PESI-MS).

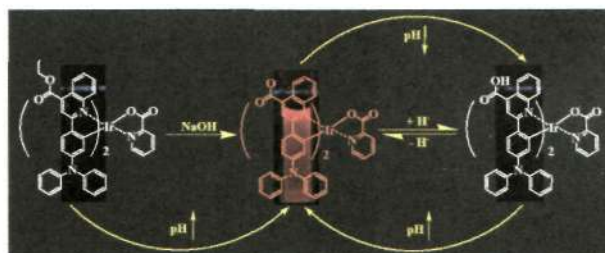


1689

Effect of pH on the photophysical properties of two new carboxylic-substituted iridium(III) complexes

Jiena Weng, Qunbo Mei,* Weiwei Jiang, Quli Fan, Bihai Tong, Qidan Ling and Wei Huang*

Two cyclometalated iridium(III) complexes based on 2-(4-diphenylamino-phenyl)-quinoline which incorporate carboxylic acid ethyl ester and carboxylic acid substituents at the 4-position of the quinoline ligand, respectively.

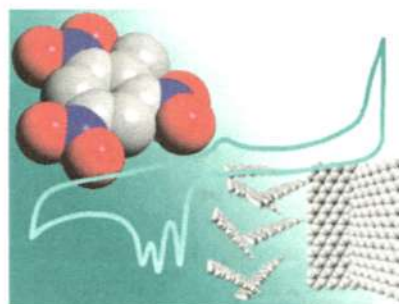


1700

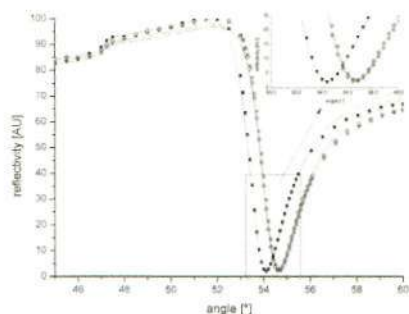
Graphenes prepared from multi-walled carbon nanotubes and stacked graphene nanofibers for detection of 2,4,6-trinitrotoluene (TNT) in seawater

Shu Min Tan, Chun Kiang Chua and Martin Pumera*

The voltammetric detection of 2,4,6-trinitrotoluene (TNT) in seawater has been examined on graphene prepared from the unzipping of multi-walled carbon nanotubes (MWCNTs) and from the exfoliation of stacked graphene nanofibers (SGNFs).



1705

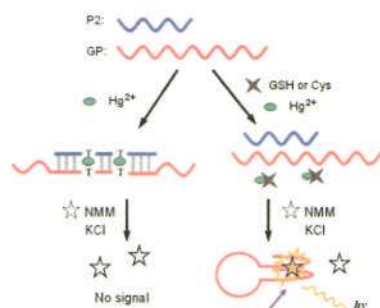


A mixed alkanethiol based immunosensor for surface plasmon field-enhanced fluorescence spectroscopy in serum

Andreas Scholten, Bernhard Menges, Martin Juebner, Markus A. Rothschild and Katja Bender*

This paper describes a simple and sensitive immuno-based biosensor for interference-reduced detection of C-reactive protein (CRP) in serum.

1713

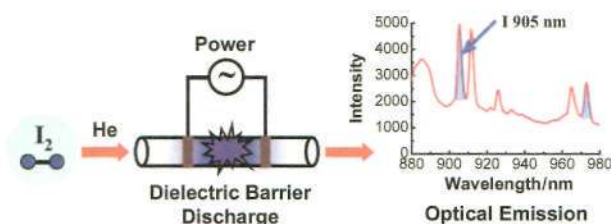


A Hg²⁺-mediated label-free fluorescent sensing strategy based on G-quadruplex formation for selective detection of glutathione and cysteine

Jingjin Zhao, Chunfei Chen, Liangliang Zhang, Jianhui Jiang, Guoli Shen and Ruqin Yu*

A Hg²⁺-mediated label-free fluorescent sensing strategy based on G-quadruplex formation has been developed for highly sensitive and selective detection of glutathione and cysteine.

1719

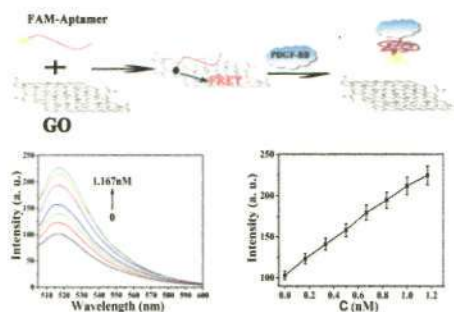


Iodine excitation in a dielectric barrier discharge micro-plasma and its determination by optical emission spectrometry

Yong-Liang Yu, Shuai Dou, Ming-Li Chen and Jian-Hua Wang*

Iodine excitation and emission is facilitated in a dielectric barrier discharge micro-plasma facilitating its determination by optical emission spectrometry.

1726



A highly sensitive and selective aptasensor based on graphene oxide fluorescence resonance energy transfer for the rapid determination of oncoprotein PDGF-BB

Junfei Liang, Ran Wei, Shuai He, Yikan Liu, Lin Guo* and Lidong Li*

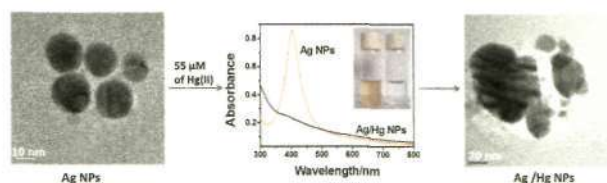
A highly sensitive and selective aptasensor based on graphene oxide FRET for the rapid determination of oncoprotein platelet derived growth factor-BB (PDGF-BB) is developed.

1733

Silver nanoparticles embedded in cyclodextrin-silicate composite and their applications in Hg(II) ion and nitrobenzene sensing

Shanmugam Manivannan and Ramasamy Ramaraj*

Hg(II) ion sensing by different Ag NPs embedded in functionalized silicate sol-gel was studied using spectral and colorimetric methods.

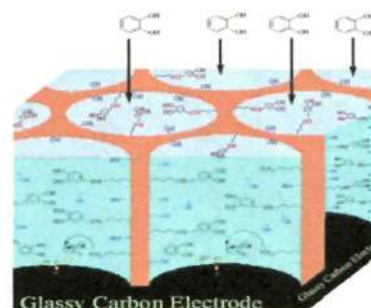


1740

Electrochemical fabrication of electroactive ordered mesoporous electrode

Mohammad Rafiee,* Babak Karimi, Yousef Abdossalami Asl and Hojatollah Vali

A nanoporous, permeable and electroactive electrode is obtained by the simple electrochemical post-functionalization of the surfaces of aligned channels of a silica-modified electrode.

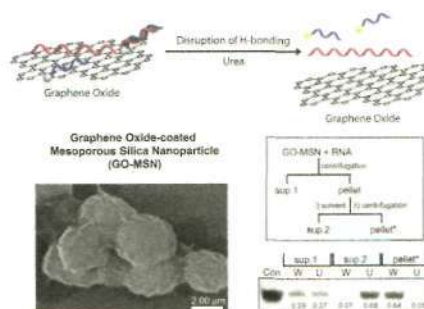


1745

Desorption of single-stranded nucleic acids from graphene oxide by disruption of hydrogen bonding

Joon Soo Park, Hee-Kyung Na, Dal-Hee Min and Dong-Eun Kim*

Graphene oxide (GO) is known to interact with single-stranded nucleic acids through pi-stacking interactions and hydrogen bonds between the nucleobases and the hexagonal cells of GO. Bound single-stranded nucleic acids can be readily dissociated from GO by disrupting hydrogen bonding with urea.

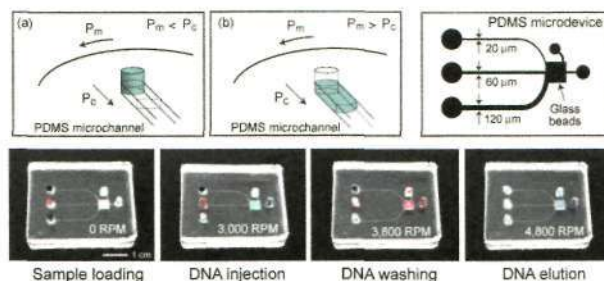


1750

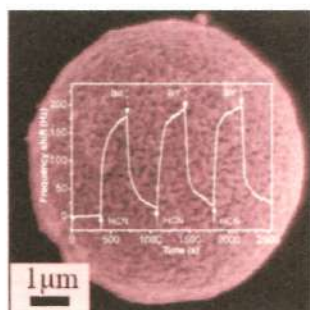
Solid-phase based on-chip DNA purification through a valve-free stepwise injection of multiple reagents employing centrifugal force combined with a hydrophobic capillary barrier pressure

Hainan Zhang, Hong Hanh Tran, Bong Hyun Chung and Nae Yoon Lee*

Centrifugal force combined with a hydrophobic capillary barrier pressure on a PDMS microdevice ensures a stepwise injection of multiple reagents in a valve-free manner, applicable for solid-phase based on-chip DNA purification.



1758

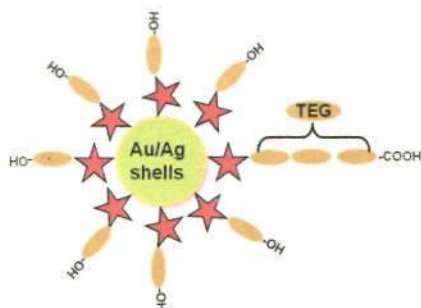


Synthesis of nanostructured copper oxide via oxalate precursors and their sensing properties for hydrogen cyanide gas

Mingqing Yang, Junhui He,^{*} Xiaochun Hu, Chunxiao Yan and Zhenxing Cheng

Nanostructured copper oxide of varied morphologies and high surface areas were prepared by calcination of copper oxalate precursors. The sphere-like CuO (specific surface area: 73 m² g⁻¹) functionalized QCM resonators were fabricated and explored for HCN. The CuO functionalized QCM sensors may be applicable for HCN.

1764

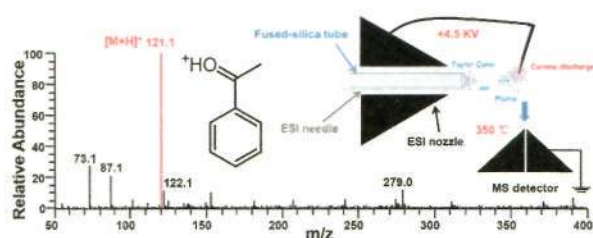


Microspectroscopic SERS detection of interleukin-6 with rationally designed gold/silver nanoshells

Yuling Wang, Mohammad Salehi, Max Schütz, Katharina Rudi and Sebastian Schlücker^{*}

Sensitive interleukin-6 detection was achieved by employing rationally designed gold/silver nanoshells with plasmon resonances optimized for red laser excitation.

1772

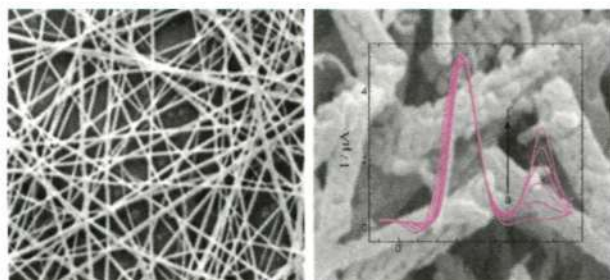


Compound coverage enhancement of electrospray ionization mass spectrometry through the addition of a homemade needle

Shun Xiao, Shuai Qian, Yi Wang, Yufeng Zhang^{*} and Yiyu Cheng

The response of many undetectable compounds in ESI-MS has been enhanced by the addition of a homemade needle.

1779



Nanostructured α -Fe₂O₃ platform for the electrochemical sensing of folic acid

Thandavarayan Maiyalagan, J. Sundaramurthy, P. Suresh Kumar, Palanisamy Kannan,^{*} Marcin Opallo^{*} and Seeram Ramakrishna^{*}

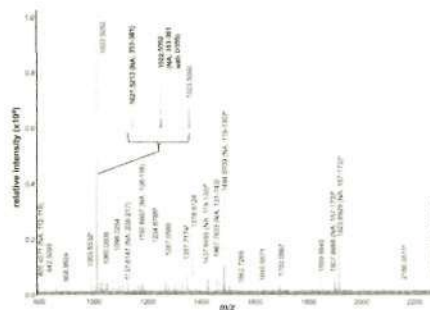
α -Fe₂O₃ nanofibers are synthesized by a simple and efficient electrospinning method and the selective determination of folic acid is demonstrated in the presence of an important physiological interferent, ascorbic acid, using the α -Fe₂O₃ nanofiber modified glassy carbon electrode at physiological pH.

1787

Subtyping of influenza neuraminidase using mass spectrometry

An P. Nguyen and Kevin. M. Downard*

A proteotyping approach which employs high resolution mass spectrometry is shown to be able to differentiate all nine neuraminidase subtypes of type A influenza viruses that infect both humans and animals.

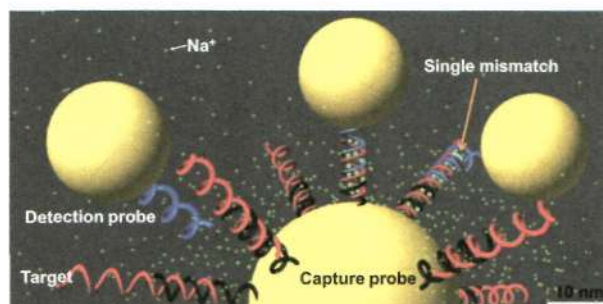


1794

Femtomolar detection of single mismatches by discriminant analysis of DNA hybridization events using gold nanoparticles

Xingyi Ma and Sang Jun Sim*

Ultrasensitive and selective detection of single mismatches based on salt-induced discriminant analysis of DNA hybridization events using well-designed gold nanoprobosc.

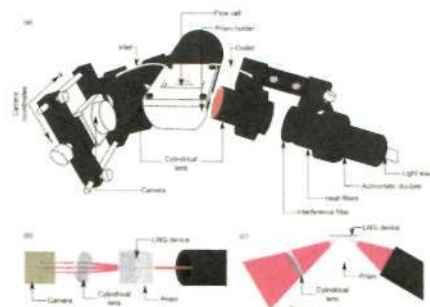


1803

A novel leaky waveguide grating (LWG) device for evanescent wave broadband absorption spectroscopy in microfluidic flow cells

Ruchi Gupta* and Nick J. Goddard

Evanescent wave (EW) broadband absorption spectroscopy is commonly interfaced with a range of analytical systems, including microfluidic flow cells, for identification and quantitation of species.

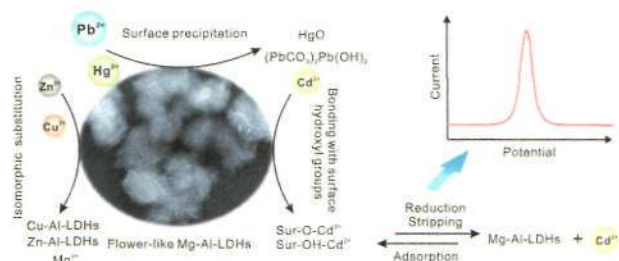


1812

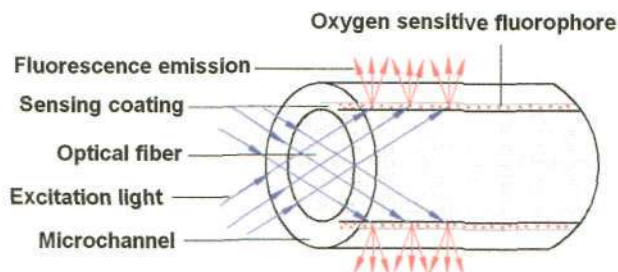
Enhancing selectivity in stripping voltammetry by different adsorption behaviors: the use of nanostructured Mg–Al-layered double hydroxides to detect Cd(II)

Ren-Xia Xu, Xin-Yao Yu, Chao Gao, Jin-Huai Liu, Richard G. Compton and Xing-Jiu Huang*

Flower-like Mg–Al-LDHs were used for the selective detection of Cd²⁺ individually based on different adsorption mechanisms toward heavy metal ions.



1819

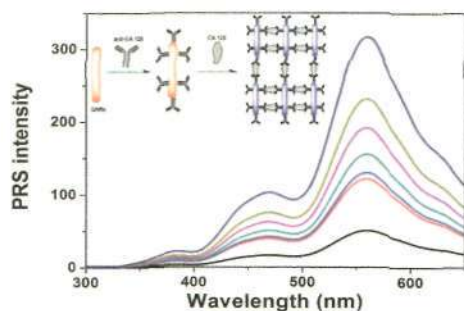


An integrated micro-volume fiber-optic sensor for oxygen determination in exhaled breath based on iridium(III) complexes immobilized in fluorinated xerogels

Yan Xiong,* Zhongbin Ye, Jing Xu, Yuanqiang Zhu, Chen Chen and Yafeng Guan

A fiber-optic sensor with μL detection volume was developed for oxygen determination using iridium(III) complexes as sensitive fluorophores.

1828

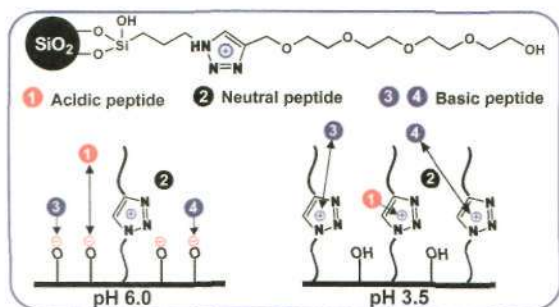


Cancer antigen 125 detection using the plasmon resonance scattering properties of gold nanorods

Kaixia Zhang* and Xiaolei Shen*

A new assay for CA 125 using the plasmon resonance scattering properties of gold nanorods.

1835

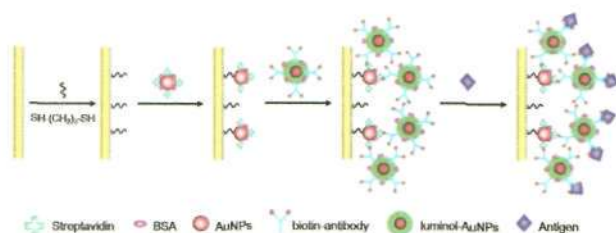


Orthogonal separation and identification of long-chain peptides from scorpion *Buthus martensi* Karsch venom by using two-dimensional mixed-mode reversed phase-reversed phase chromatography coupled to tandem mass spectrometry

Junyan Xu, Xiuli Zhang,* Zhimou Guo, Jingyu Yan, Long Yu, Xiuling Li, Xingya Xue and Xinmiao Liang*

We report an orthogonal two-dimensional chromatographic separation system including a novel reversed phase/ion exchange stationary phase to achieve peptides separation of scorpion venom with high efficiency.

1844



Label-free electrochemiluminescence immunosensor for cardiac troponin I using luminol functionalized gold nanoparticles as a sensing platform

Fang Li, Yuqi Yu, Hua Cui,* Di Yang and Zhiping Bian

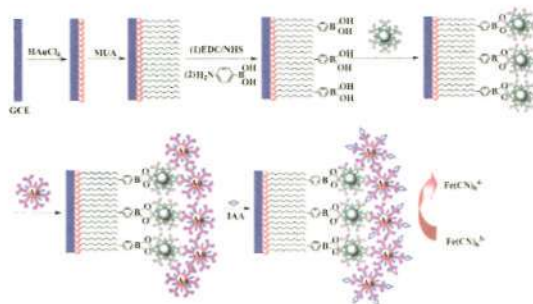
A simple and sensitive label-free electrochemiluminescence immunosensor for AMI biomarker cardiac troponin I was developed by using luminol functionalized gold nanoparticles as antibody carriers and sensing platform.

1851

An ultrasensitive electrochemical immunosensor platform with double signal amplification for indole-3-acetic acid determinations in plant seeds

Huanshun Yin, Zhenning Xu, Yunlei Zhou, Mo Wang and Shiyun Ai*

A label-free electrochemical immunosensor for ultrasensitive detection of indole-3-acetic acid (IAA) has been developed based on Fe_3O_4 -HRP-IgG and AuNPs-anti-IAA antibody.

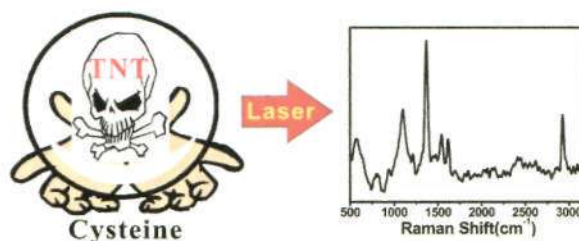


1858

SERS and OWGS detection of dynamic trapping molecular TNT based on a functional self-assembly Au monolayer film

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

Cysteine dynamic capture of TNT explosives based on a functional Au monolayer film to realize TNT detection by SERS.

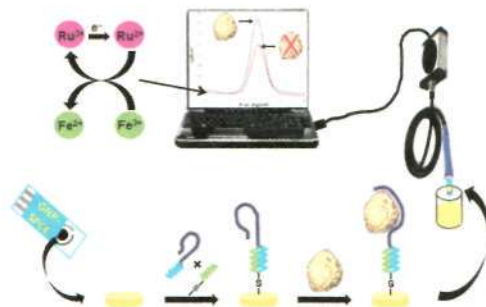


1865

Multifunctional electrochemical aptasensor for aptamer clones screening, virus quantitation in blood and viability assessment

Mahmoud Labib, Anna S. Zamay and Maxim V. Berezovski*

Multifunctional electrochemical aptasensor for aptamers screening, viral analysis and viability assessment.



1876

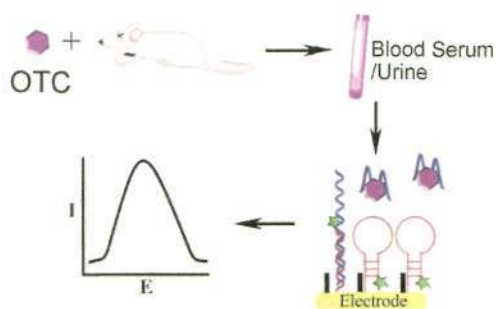
Boronic acid-functionalized detonation nanodiamond for specific enrichment of glycopeptides in glycoproteome analysis

Guobin Xu, Wei Zhang, Liming Wei,* Haojie Lu and Pengyuan Yang*

A novel approach for fast and efficient specific enrichment of glycopeptides from a complex sample is developed by amino-phenyl boronic acid functionalized detonation nanodiamond assisted by poly-L-lysine and PEG-diglycolic acid as a probe.



1886



An electrochemical biosensor for the direct detection of oxytetracycline in mouse blood serum and urine

Dianyuan Zheng, Xiaoli Zhu, Xuejun Zhu, Bing Bo, Yongmei Yin and Genxi Li*

An electrochemical aptasensor was developed for the direct detection of oxytetracycline in blood serum and urine.

1891

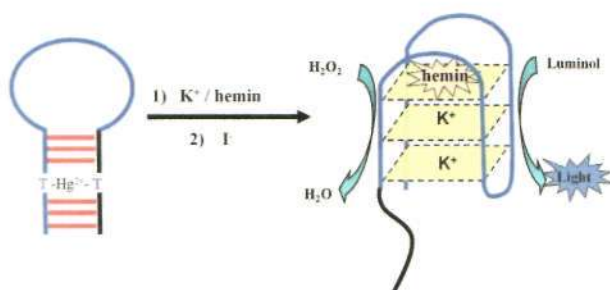


An Al^{3+} and $\text{H}_2\text{PO}_4^-/\text{HSO}_4^-$ selective conformational arrest and bail to a pyrimidine-naphthalene anchored molecular switch

Ajit Kumar, Virendra Kumar and K. K. Upadhyay*

An Al^{3+} selective conformational arrest and subsequent bail by $\text{H}_2\text{PO}_4^-/\text{HSO}_4^-$ to a pyrimidine-naphthalene anchored Schiff base led to its 'on-off' fluorescence switching.

1898



Chemiluminescence assay for the sensitive detection of iodide based on extracting Hg^{2+} from a T- Hg^{2+} -T complex

Tao Li, Gang Liang and Xiaohong Li*

A highly sensitive DNA sensor for chemiluminescence detection of I⁻ based on extracting Hg^{2+} from a T- Hg^{2+} -T complex.

1903



A highly selective and sensitive probe for colorimetric and fluorogenic detection of Cd^{2+} in aqueous media

Shyamaprosad Goswami,* Krishnendu Aich, Sangita Das, Avijit Kumar Das, Abhishek Manna and Sandipan Halder

A new rhodamine-quinoline based dyad has been synthesized.