

The Analyst

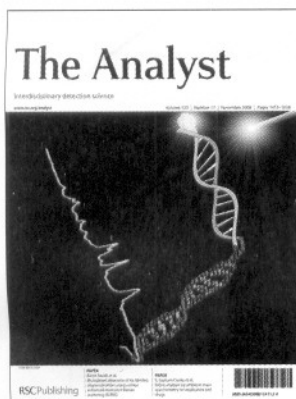
Interdisciplinary detection science

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ISSN 0003-2654 CODEN ANALAO 133(11) 1457–1628 (2008)

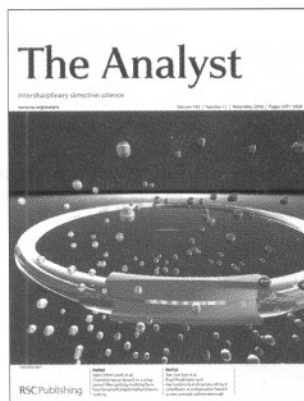


Cover

See K. Faulds, R. Jarvis, W. E. Smith, D. Graham and R. Goodacre, pp. 1505–1512.

The interaction of laser light with a labelled strand of DNA, resulting in a SERRS spectrum which identifies the sequence present.

Image designed by Richard O'Connor (University of Manchester) and reproduced by permission of Karen Faulds from *Analyst*, 2008, **133**, 1505.



Inside cover

See J. Barnes, M. Dreher, K. Plett, R. S. Brown, C. M. Crudden and H.-P. Look, pp. 1541–1549.

Long-period gratings (LPGs) are fibre-optic devices sensitive to refractive index changes. Coating LPGs with a custom-PDMS microextraction phase enhances the refractive index, obtaining rudimentary chemical selectivity. Optical response is further enhanced by placing the LPG in a loop of optical telecom fibre.

Image reproduced by permission of Hans-Peter Look from *Analyst*, 2008, **133**, 1541.

CHEMICAL TECHNOLOGY

T81

Drawing together research highlights and news from all RSC publications, *Chemical Technology* provides a 'snapshot' of the latest applications and technological aspects of research across the chemical sciences, showcasing newsworthy articles and significant scientific advances.

Chemical Technology

November 2008/Volume 5/Issue 11

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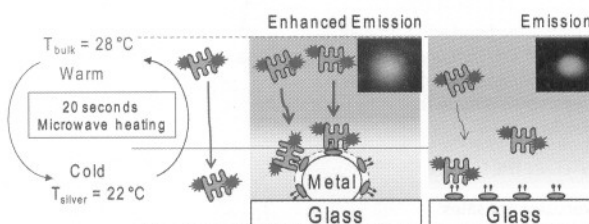
i-SECTION: HIGHLIGHTS

1469

New tools for rapid clinical and bioagent diagnostics: microwaves and plasmonic nanostructures

Kadir Aslan and Chris D. Geddes*

The combined use of microwaves with plasmonic nanostructures provides for the ultra-fast and sensitive quantitative determination of both clinical analytes and biothreat agents.



1481

Affinity assays for detection of cellular communication and biomarkers

Christelle Guillo and Michael G. Roper*

In this review, we summarize several new affinity assays and how they are used to quantify the peptides, proteins, and small molecules used by cells to communicate to other cells and throughout the body.



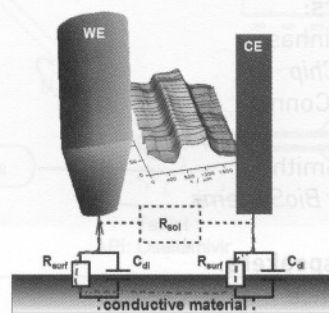
I-SECTION: TUTORIAL REVIEW

1486

Alternating current techniques in scanning electrochemical microscopy (AC-SECM)

Kathrin Eckhard and Wolfgang Schuhmann*

Alternating current scanning electrochemical microscopy (AC-SECM) is a growing branch within the variety of SECM methods. This review covers publications involving AC-SECM from its beginning to date. The findings of several research groups are thematically structured along with the specific experimental procedures. This should enable researchers to rationally choose purposeful parameters for their AC-SECM experiments.



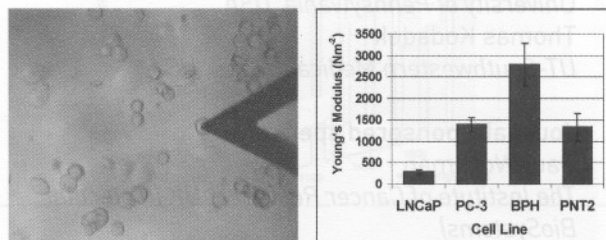
COMMUNICATIONS

1498

Measurement of elastic properties of prostate cancer cells using AFM

Elsa Correia Faria,* Nan Ma, Ehsan Gazi, Peter Gardner, Mick Brown, Noel W. Clarke and Richard D. Snook

It has been suggested that there is a correlation between cancer cell invasiveness and cell elasticity. The applicability of this hypothesis to prostate cancer is tested using AFM.

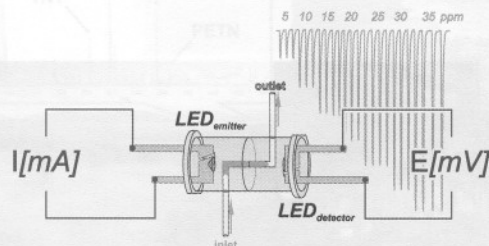


1501

Paired emitter detector diode (PEDD)-based photometry – an alternative approach

Łukasz Tymecki,* Marta Pokrzywnicka and Robert Koncki

According to the developed model based on Shockley equation and the Lambert–Beer law, PEDD-based photometric devices generate a potentiometric analytical signal that is directly proportional to the analyte concentration.

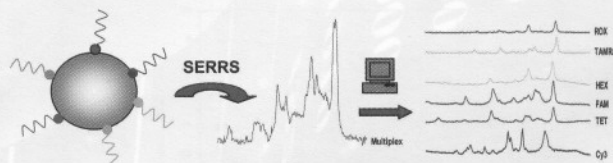


1505

Multiplexed detection of six labelled oligonucleotides using surface enhanced resonance Raman scattering (SERRS)

Karen Faulds,* Roger Jarvis, W. Ewen Smith, Duncan Graham and Royston Goodacre*

The multiplexed, simultaneous detection of six different dye-labelled DNA sequences in a mixture by SERRS, with the aid of multivariate analysis, is reported.

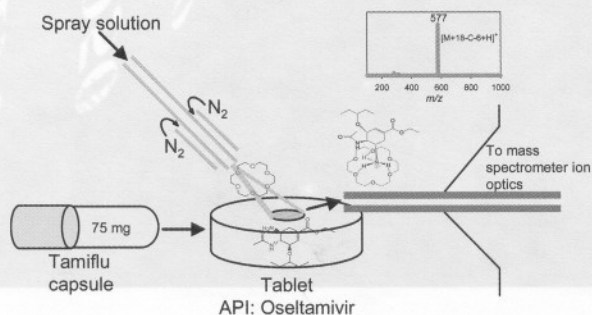


1513

Desorption electrospray ionization reactions between host crown ethers and the influenza neuraminidase inhibitor oseltamivir for the rapid screening of Tamiflu®

Leonard Nyadong, Edward G. Hohenstein, Kristin Johnson, C. David Sherrill, Michael D. Green and Facundo M. Fernández*

Reactive DESI-MS *via* competitive host-guest reactions between crown ethers and oseltamivir provides an effective means for the qualitative and semi-quantitative screening of Tamiflu® capsules for drug quality control and anti-counterfeiting applications.

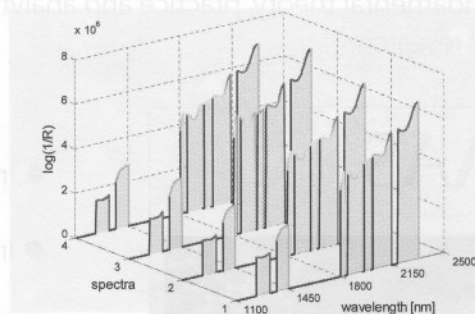


1523

Near-infrared reflectance spectroscopy and multivariate calibration techniques applied to modelling the crude protein, fibre and fat content in rapeseed meal

M. Daszykowski, M. S. Wrobel, H. Czarnik-Matusewicz and B. Walczak*

Interpretation of multivariate calibration models is easier when variable selection techniques or certain data pre-processing techniques are used.

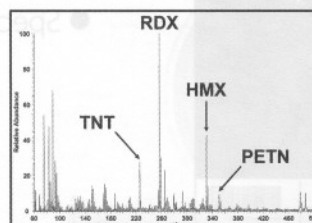


1532

Fabric analysis by ambient mass spectrometry for explosives and drugs

Nari Talaty, Christopher C. Mulligan, Dina R. Justes, Ayanna U. Jackson, Robert J. Noll and R. Graham Cooks*

Rapid, trace analysis of explosives and drugs of abuse from untreated fabric surfaces is accomplished using desorption electrospray ionization (DESI), even in the presence of an interfering chemical matrix, suggesting applicability to screening of people and luggage.

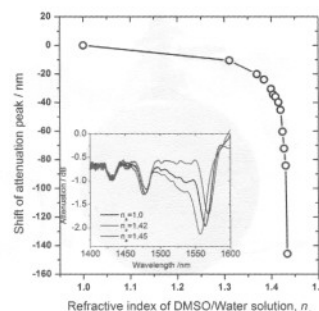


1541

Chemical sensor based on a long-period fibre grating modified by a functionalized polydimethylsiloxane coating

Jack Barnes, Marian Dreher, Krista Plett,
R. Stephen Brown, Cathleen M. Crudden and
Hans-Peter Loock*

A long-period grating (LPG) is sensitive to refractive index changes. Designer coatings provide higher sensitivity and chemical selectivity and make LPGs good candidates for fibre-optic based chemical sensors.

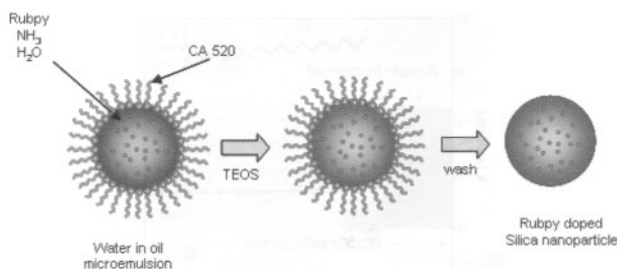


1550

Dye-doped silica nanoparticle labels/protein microarray for detection of protein biomarkers

Hong Wu, Qisheng Huo, Susan Varnum, Jun Wang,
Guodong Liu, Zimin Nie, Jun Liu* and Yuche Lin*

A dye-encapsulated silica nanoparticle as a label, with the advantages of high fluorescence intensity, photostability, and biocompatibility, in conjunction with microarray technology for sensitive immunoassay of a biomarker, interleukin-6 (IL-6), on a microarray format.



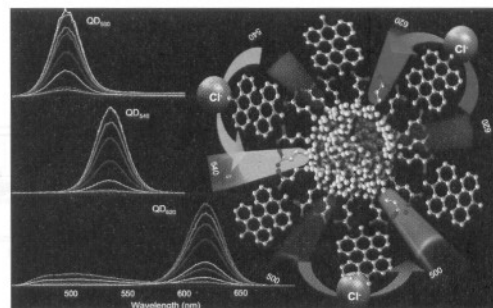
1556



A quantum dot–lucigenin probe for Cl^-

Maria Jose Ruedas-Rama and Elizabeth A. H. Hall*

The quantum dot–bipyridinium dication, using lucigenin (bis-*N*-methylacridinium), allows short range fluorescence quenching. It is reported as the basis for a chloride ion-selective QD (I-QD).

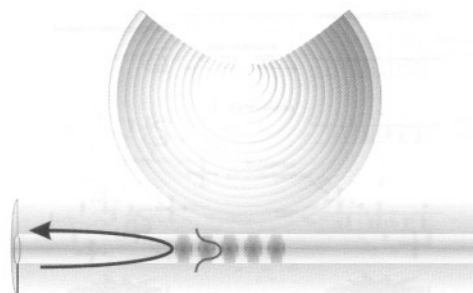


1567

Fiber Bragg grating photoacoustic detector for liquid chromatography

Qingxin Yang, Hans-Peter Loock,* Igor Kozin and
David Pedersen

A Fiber Bragg Grating is an all-optical acoustic transducer that can be used for time-resolved photoacoustic detection in HPLC or capillary electrophoresis.



1573

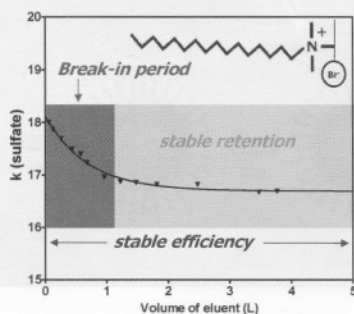


Dispersions of alkyl-capped silicon nanocrystals in aqueous media: photoluminescence and ageing

F. M. Dickinson, T. A. Alsop, N. Al-Sharif, C. E. M. Berger, H. K. Datta, L. Šiller, Y. Chao, E. M. Tuite, A. Houlton and B. R. Horrocks

Alkyl-capped silicon quantum dots can be dispersed in aqueous media using small quantities of organic solvents. These particles are stable, bright luminescent stains, well-suited for applications in cell biology.

1581

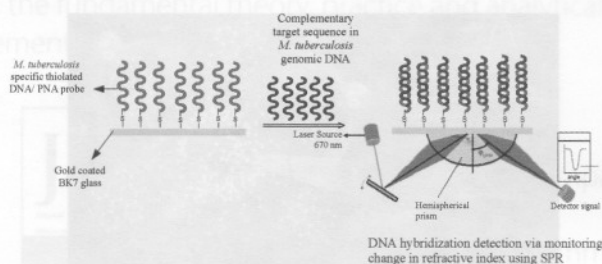


Stability of surfactant coated columns for ion chromatography

Karen M. Glenn and Charles A. Lucy

After an initial break-in, surfactant coated RPLC columns show stable retention and efficiency for the separation of inorganic anions.

1587

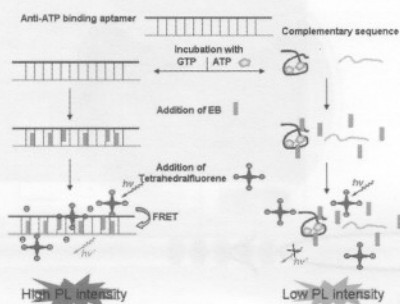


Nucleic acid sensor for *M. tuberculosis* detection based on surface plasmon resonance

Nirmal Prabhakar, Kavita Arora, Sunil K. Arya, Pratima R. Solanki, M. Iwamoto, Harpal Singh and B. D. Malhotra*

Direct detection of *M. tuberculosis* target sequence in sonicated genomic DNA using a surface plasmon resonance based nucleic acid sensor revealing improved detection limits and specificity using a peptide nucleic acid (PNA) probe compared to a DNA probe.

1593



ATP detection using a label-free DNA aptamer and a cationic tetrahydrofluorene

Yanyan Wang and Bin Liu*

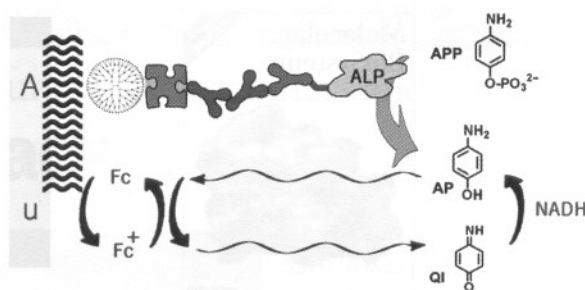
We report a simple and sensitive method for ATP detection using a label-free DNA aptamer and a tetrahydrofluorene sensitized ethidium bromide emission.

1599

An electrochemical immunosensor using *p*-aminophenol redox cycling by NADH on a self-assembled monolayer and ferrocene-modified Au electrodes

Seong Jung Kwon, Haesik Yang,* Kyungmin Jo and Juhyoun Kwak*

An electrochemical immunosensor using *p*-aminophenol (AP) redox cycling by NADH on a Fc-modified Au electrode is reported; this new redox cycling scheme operates in the absence of diaphorase enzyme.

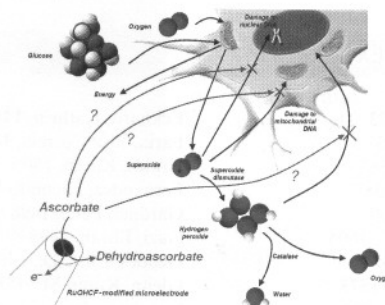


1605

Continuous monitoring of ascorbate transport through neuroblastoma cells with a ruthenium oxide hexacyanoferrate modified microelectrode

Thiago R. L. C. Paixão, Lívia F. Barbosa, Maria T. Carri, Marisa H. G. Medeiros and Mauro Bertotti*

Preliminary results on *in vivo* monitoring of ascorbate inside neuroblastoma cells indicate that the proposed sensor can be conveniently used to understand the dynamics of ascorbate consumption inside single cells.

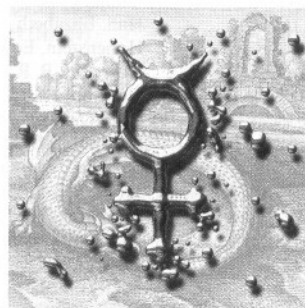


1611

Accurate calibration of mercury vapour measurements

Richard J. C. Brown* and Andrew S. Brown

This paper discusses the thermodynamic and kinetic considerations that must be taken into account when calibrating mercury vapour measurements, provides the theoretical basis for these considerations, and presents corroborating experimental data. Image © Murray Robertson 1999–2008.



1619

Rapid hydrolysis and electrochemical detection of trace carbofuran at a disposable heated screen-printed carbon electrode

Hang Wei, Jian-Jun Sun,* Yan-Min Wang, Xiao Li and Guo-Nan Chen

Rapid hydrolysis and electrochemical detection of environmental pollutant carbofuran is performed at a disposable heated screen-printed carbon electrode (HSPCE) with easily raised electrode temperature by using an ac current.

