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ISSN 0003-2654  CODEN ANALAO  135(1) 1–196 (2010)

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Analyst

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MINIREVIEW

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Viruses and their potential in bioimaging and biosensing applications
Kai Li, Huong Giang Nguyen, Xiaobing Lu and Qian Wang*

Successful development of ultrasensitive constructs for bioimaging and biosensing is a challenging task. This review highlights some recent progress in the applications of viruses in bioimaging and biosensing.

COMMUNICATIONS

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Molecular imaging of adrenal gland by desorption electrospray ionization mass spectrometry
Chunping Wu, Demian R. Ifa, Nicholas E. Manicke and R. Graham Cooks*

Subtle differences in the spatial distributions of different classes of compounds in adrenal glands – catecholamines, fatty acids, phospholipids, cholesterol, and ascorbic acid – are easily distinguished using rapid and sample-preparation-free DESI-MS imaging under ambient conditions.

33
A novel reversible relative-humidity indicator ink based on methylene blue and urea
Andrew Mills,* Pauline Grosshans and David Hazafy

A novel relative-humidity indicator based on methylene blue and deliquescent urea which is pink, and highly crystalline under ambient conditions but is rapidly rendered blue and crystal-free at RH > 85%.

PAPERS

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Improving limits of detection for B-type natriuretic peptide using PC-IDMS: An application of the ALiPHAT strategy
Christopher M. Shuford, Daniel L. Comins, Jerry L. Whitten, John C. Burnett, Jr. and David C. Muddiman*

Nonpolar surface area is used as a metric for evaluating the effect of hydrophobicity on PC-IDMS detection limits for the cardiac biomarker, B-type natriuretic peptide.
Call for Papers

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Bioconjugated lanthanide luminescent helicates as multilabels for lab-on-a-chip detection of cancer biomarkers

Vanesa Fernández-Moreira, Bo Song, Venkataramagalu Sivagnanam, Anne-Sophie Chauvin, Caroline D. B. Vandevyver, Martin Gijs, Ilkka Hemmilä, Hans-Anton Lehr and Jean-Claude G. Bünzli*

Lanthanide luminescent bioprobes (LLBs) combined with microfluidics and lab-on-a-chip technology lead to fast dual assays of cancerous tissue biomarkers.

Fourier transform infrared (FTIR) spectromicroscopic characterization of stem-like cell populations in human esophageal normal and adenocarcinoma cell lines

R. Zhao, L. Quaroni* and A. G. Casson*

We use Fourier transform infrared spectromicroscopy with synchrotron radiation to discriminate between esophageal cell lines and their derived spheroids. We suggest that such approach could be valuable in the identification of cancer stem cells.

Sequential CD34 cell fractionation by magnetophoresis in a magnetic dipole flow sorter

Thomas Schneider, Stephan Karl, Lee R. Moore, Jeffrey J. Chalmers, P. Stephen Williams and Maciej Zborowski*

Sequential fractionation of an immunomagnetically labeled stem and progenitor cell model was achieved by modifying the successive increments to transport lamina thickness, which requires no solid physical boundaries and allows the fraction collection from different regions of the channel breadth.

Potassium-sensitive G-quadruplex DNA for sensitive visible potassium detection

Xuan Yang, Tao Li, Bingling Li and Erkang Wang*

The development and use of G-quadruplex DNA for novel visual detection of K⁺ is outlined. In view of its simplicity, sensitivity and specificity, our developed visual method for K⁺ detection would potentially be utilized for bioassays and K⁺-sensitive test paper.
High throughput screening of lead utilising disposable screen printed shallow recessed microelectrode arrays

Sebastian J. Hood, Rashid O. Kadara, Dimitrios K. Kampouris and Craig E. Banks*

The cathodic stripping of lead at a disposable screen printed microelectrode array is shown to be possible for the sensing of lead in river water at EU required levels.

Rapid identification of stabilisers in polypropylene using time-of-flight mass spectrometry and DART as ion source

Manuela Haunschmidt,* Christian W. Klampfl, Wolfgang Buchberger and Robert Hertsens

We report the development of a method for analysing polymer stabilisers in toluene extracts of plastic samples but also in solid samples without any sample pretreatment using direct analysis in real time mass spectrometry (DART-MS).

Cadmium binding in mixtures of phytochelatins and their fragments: A voltammetric study assisted by multivariate curve resolution and mass spectrometry

Rui Gusmão, Cristina Ariño, José Manuel Díaz-Cruz and Miquel Esteban*

Shape analysis of the resulting pure voltammograms and concentration profiles of the components resolved by MCR-ALS suggests that longer-chain thiols displace the shorter ones from their metal complexes.

Dual contactless conductivity and amperometric detection on hybrid PDMS/glass electrophoresis microchips

Mercedes Vázquez, Celeste Frankenfeld, Wendell K. Tomazelli Coltro, Emanuel Carrilho, Dermot Diamond and Susan M. Lunte*

A new approach for the integration of dual contactless conductivity and amperometric detection with an electrophoresis microchip system is presented. The simultaneous determination of ionic and electroactive species was illustrated by the separation of peroxynitrite degradation products.
Fluorescent sensing of homocysteine in urine: Using fluorosurfactant-capped gold nanoparticles and o-Phthaldialdehyde

Jia-Hui Lin, Chung-Wei Chang and Wei-Lung Tseng*

This study reports the development of a simple, sensitive, and selective-detection system for homocysteine based on the combination of fluorosurfactant-capped gold nanoparticles and o-phthaldialdehyde.

BSA activated CdTe quantum dot nanosensor for antimony ion detection

Shenguang Ge, Congcong Zhang, Yuanna Zhu, Jinghua Yu* and Shuangshuang Zhang

A simple, sensitive, selective and fast QD-based BSA sensing ensemble was developed for the detection of antimony.

A sensitive electrochemical approach for monitoring the effects of nano-Al2O3 on LDH activity by differential pulse voltammetry

Kaian Yao, Deqian Huang, Bolei Xu, Na Wang, Yingjie Wang and Shuping Bi*

Based on the determination of reduction current of NAD+ involved in LDH enzyme promoting catalytic reaction, a sensitive electrochemical approach for monitoring the effect of nano-Al2O3 on LDH activity is established.

An electrochemical molecular switch for one-step, reusable detection of a single-base mutation of DNA

Xiaoyong Jin, Yuehua Fei, Liangliang Zhang, Xueping Liu, Guoli Shen* and Ruqin Yu

A new strategy for one-step, reusable and sensitive detection of a single-base mutation (SBM) based on a signal-on electrochemical molecular switch is developed in the present work.
Analytical protocol for identification of BMAA and DAB in biological samples

Zdeněk Spáčil, Johan Eriksson,* Sara Jonasson, Ulla Rasmussen, Leopold L. Ilag* and Birgitta Bergman

We present a robust and sensitive method for high confidence identification of BMAA after derivatization by 6-aminoquinolyl-N-hydroxysuccinimidyl carbamate. The method is applicable for selective BMAA/DAB detection in various biological samples ranging from a prokaryotic cyanobacterium to eukaryotic fish.

Following interfacial kinetics in real time using broadband evanescent wave cavity-enhanced absorption spectroscopy: a comparison of light-emitting diodes and supercontinuum sources


A white light-emitting diode and a supercontinuum source have been evaluated for use in broadband evanescent wave cavity-enhanced absorption spectroscopy.

A novel isotachophoresis of cobalt and copper complexes by metal ion substitution reaction in a continuous moving chelation boundary

Wei Zhang, Jian-Feng Chen, Liu-Yin Fan,* Cheng-Xi Cao,* Ji-Cun Ren, Si Li and Jing Shao

A novel separation mode of isotachophoresis (ITP) was observed in a continuous moving chelation boundary (MCB) formed with EDTA and two metal ions of Co(II) and Cu(II).

Functionalized monolayers on mesoporous silica and on titania nanoparticles for mercuric sensing

Eunjeong Kim, Sungmin Seo, Moo Lyong Seo and Jong Hwa Jung*

The optical sensing abilities of an acyclic receptor immobilized mesoporous silica (AR-SiO₂) and titania nanoparticle (AR-TiO₂) was investigated and the AR-SiO₂ and AR-TiO₂ recognized and separated Hg²⁺ with a high degree of selectivity among heavy metal ions in aqueous solution.
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The differentiation and engraftment potential of mouse hematopoietic stem cells is maintained after bio-electrospray

K. Bartolovic, N. Mongkoldhumrongkul, S. N. Waddington, S. N. Jayasinghe* and S. J. Howe

These first studies, demonstrate bio-electrospray’s in vivo capabilities. The authors are studying a wide range of tissues/organs in animal models, for paving the way for initiating this biotechnology’s path into translational studies for possible human clinical trials.

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Rapid tandem-column micro-gas chromatography based on optofluidic ring resonators with multi-point on-column detection

Yuze Sun, Jing Liu, Daniel J. Howard, Greg Frye-Mason, Aaron K. Thompson, Shiou-jyh Ja and Xudong Fan*

A novel tandem-column micro-gas chromatography based on optofluidic ring resonator is demonstrated.

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Cyclic voltammetry on recessed nanodisk-array electrodes prepared from track-etched polycarbonate membranes with 10-nm diameter pores

D. M. Neluni T. Perera and Takashi Ito*

The surface properties of 10-nm diameter nanopores in a track-etched polycarbonate membrane were systematically investigated using cyclic voltammetry.

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Multiplex tumor marker detection with new chemiluminescent immunoassay based on silica colloidal crystal beads

Xiaoping Pei, Baoan Chen,* Li Li, Feng Gao and Zhi Jiang

We developed a novel suspension array for clinical detection. The method based on Silica colloidal crystal beads (SCCBs) as coding carriers is very sensitive by combining CLIA.
Development and validation of a multiplex bead assay for measuring growth mediators in wound fluid

Thanasak Rakmanee, Irwin Olsen,* Gareth S. Griffiths and Nikolaos Donos

A novel multiplex bead assay is developed to simultaneously measure eight healing-related mediators in treated periodontal wounds.

Mechanisms of supported bilayer detection using field-effect devices

Chiho Kataoka-Hamai and Yuji Miyahara*

When the formation of supported lipid bilayers is monitored by field-effect devices, salt ions specifically bound to the device surface and the charge of the bilayers both contribute to the signal generation mechanisms.
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