

IN THIS ISSUE

ISSN 0003-2654 CODEN ANALAO 148(18) 4229–4560 (2023)



Cover

See Yoshitaka Takagai *et al.*, pp. 4291–4299.

Image reproduced by permission of Kayo Yanagisawa from *Analyst*, 2023, **148**, 4291.



Inside cover

See Erin Giroux, Theresa E. Stotesbury *et al.*, pp. 4300–4309.

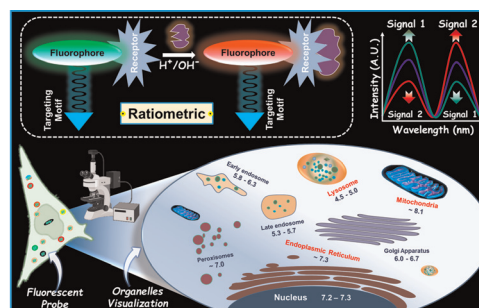
Image reproduced by permission of Erin Giroux, Irakli Ebralidze, and Theresa Stotesbury from *Analyst*, 2023, **148**, 4300.

CRITICAL REVIEWS

4242

Ratiometric fluorescent probes for pH mapping in cellular organelles

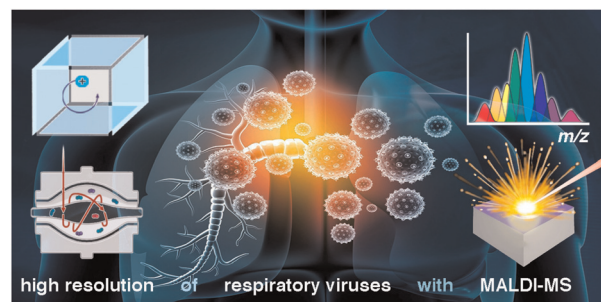
Subrata Munan, Rashmi Yadav, Niharika Pareek and Animesh Samanta*



4263

High resolution mass spectrometry of respiratory viruses: beyond MALDI-ToF instruments for next generation viral typing, subtyping, variant and sub-variant identification

Joshua S. Hoyle and Kevin M. Downard*



Editorial Staff

Executive Editor

Rebecca Garton

Deputy Editor

Alice Smallwood

Editorial Production Manager

Sarah Whitehouse

Development Editor

Celeste Brady

Publishing Editors

Gabriel Clarke, Derya Kara-Fisher,
Emma Stephen, Ziva Whitelock

Publishing Assistant

Andrea Whiteside

Editorial Assistant

Leo Curtis

Publisher

Jeanne Andres

For queries about submitted articles please contact Sarah Whitehouse, Editorial production manager, in the first instance. E-mail analyst@rsc.org

For pre-submission queries please contact Rebecca Garton, Executive editor. E-mail analyst-rsc@rsc.org

Analyst (electronic: ISSN 1364-5528) is published 24 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to the Royal Society of Chemistry Order Department, Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK

Tel +44 (0)1223 432398; E-mail orders@rsc.org

2023 Annual (electronic) subscription price: £2372; US\$4152. Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT.

If you take an institutional subscription to any Royal Society of Chemistry journal you are entitled to free, site-wide web access to that journal. You can arrange access via Internet Protocol (IP) address at www.rsc.org/ip

Customers should make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank.

Whilst this material has been produced with all due care, the Royal Society of Chemistry cannot be held responsible or liable for its accuracy and completeness, nor for any consequences arising from any errors or the use of the information contained in this publication. The publication of advertisements does not constitute any endorsement by the Royal Society of Chemistry or Authors of any products advertised. The views and opinions advanced by contributors do not necessarily reflect those of the Royal Society of Chemistry which shall not be liable for any resulting loss or damage arising as a result of reliance upon this material. The Royal Society of Chemistry is a charity, registered in England and Wales, Number 207890, and a company incorporated in England by Royal Charter (Registered No. RC000524), registered office: Burlington House, Piccadilly, London W1J 0BA, UK, Telephone: +44 (0) 207 4378 6556.

Advertisement sales:

Tel +44 (0) 1223 432246; Fax +44 (0) 1223 426017;

E-mail advertising@rsc.org

For marketing opportunities relating to this journal, contact marketing@rsc.org

Analyst

rsc.li/analyst

The home of premier fundamental discoveries, inventions and applications in the analytical and bioanalytical sciences

Editorial Board

Editor-in-Chief

Norman Dovichi, University of Notre Dame, USA

Associate Editors

Damien Arrigan, Curtin University, Australia
Ryan Bailey, University of Michigan, USA
Jaebum Choo, Chung-Ang University, South Korea

Karen Faulds, University of Strathclyde, UK
Hideaki Hisamoto, Osaka Metropolitan University, Japan

Baohong Liu, Fudan University, China
Nicole Pamme, Stockholm University, Sweden

Hua-Zhong Yu, Simon Fraser University, Canada
Jun-Jie Zhu, Nanjing University, China

Members

Susan Lunte, University of Kansas, USA

Advisory Board

Matthew Baker, University of Central Lancashire, UK
Paul W Bohn, University of Notre Dame, USA

Claudia Conti, CNR, Italy
R Graham Cooks, Purdue University, USA

Jeffrey Dick, Purdue University, USA
Volker K. Deckert, University of Jena, Germany

Joshua Edel, Imperial College London, UK
Qun Fang, Zhejiang University, China

Facundo Fernandez, Georgia Institute of Technology, USA

Roy Goodacre, University of Liverpool, UK
Duncan Graham, University of Strathclyde, UK

Robert T Kennedy, University of Michigan, USA

Kagan Kerman, University of Toronto, Canada

Christine Kranz, Ulm University, Germany
Annamalai Senthil Kumar, Vellore Institute of Technology University, India

Xiujun Li, University of Texas at El Paso, USA
Lanqun Mao, Institute of Chemistry, Chinese Academy of Sciences, China

Maria Marin, University of East Anglia, UK
Pavel Matousek, Rutherford Appleton Laboratory, UK

Wei Min, Columbia University, USA
Boris Mizaikoff, University of Ulm, Germany

Prakash Chandra Mondal, Indian Institute of Technology Kanpur, India

Howbeer Muhamadali, University of Liverpool, UK
Takeaki Ozawa, University of Tokyo, Japan

Ashley Ross, University of Cincinnati, USA
Muhammad Shiddiky, Griffith University, Australia

Debbie Silvester, Curtin University, Australia
Steven A. Soper, University of Kansas, USA

Dana Spence, Michigan State University, USA
Nick Stone, University of Exeter, UK

Evan Williams, University of California, USA
Chaoyong James Yang, Xiamen University, China

Yilun Ying, Nanjing University, China

Information for Authors

Full details on how to submit material for publication in Analyst are given in the Instructions for Authors (available from <http://www.rsc.org/authors>). Submissions should be made via the journal's homepage: rsc.li/analyst

Authors may reproduce/republish portions of their published contribution without seeking permission from the Royal Society of Chemistry, provided that any such republication is accompanied by an acknowledgement in the form: (Original Citation)–Reproduced by permission of the Royal Society of Chemistry.

This journal is © The Royal Society of Chemistry 2023.

Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted

under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulation 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission in writing of the Publishers or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK. US copyright law is applicable to users in the USA.

© The paper used in this publication meets the requirements of ANSI/NISO Z39.48–1992 (Permanence of Paper).

Registered charity number: 207890

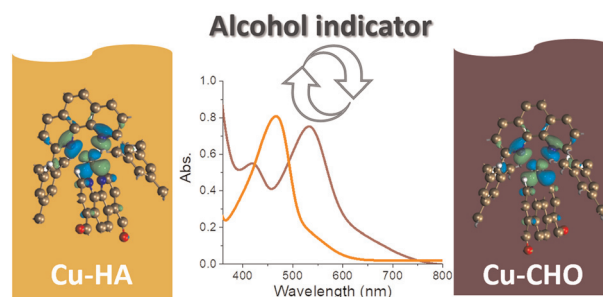


COMMUNICATIONS

4274

Optical detection of alcohols with a Cu(I)HETPHEN complex by reversible aldehyde to hemiacetal conversion

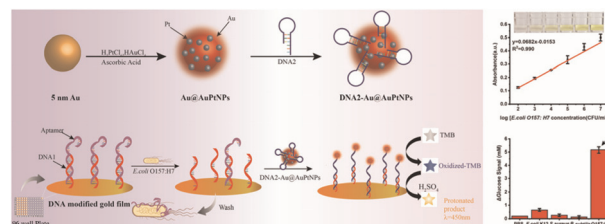
Lei Wang,* Zhu-Lin Xie, Xin Li, Vincent M. Lynch and Karen L. Mulfort*



4279

Highly catalytic and stable Au@AuPt nanoparticles for visual and quantitative detection of *E. coli* O157:H7

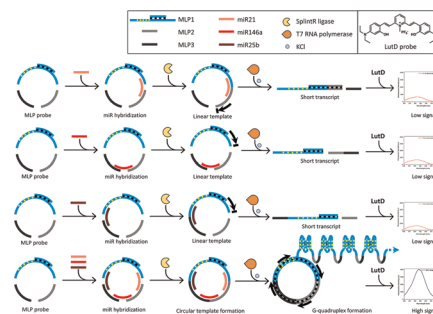
Yanyu Zhang, Jiangshang Su, Tingting Fu, Wanzhen Zhang, Yujuan Xiao and Yishun Huang*



4283

Triple ligation-based formation of a G-quadruplex for simultaneous detection of multiple miRNAs

Kazi Morshed Alom and Young Jun Seo*

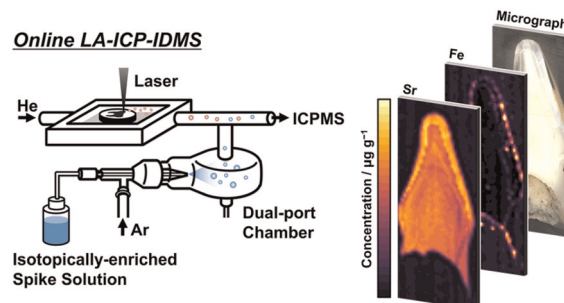


PAPERS

4291

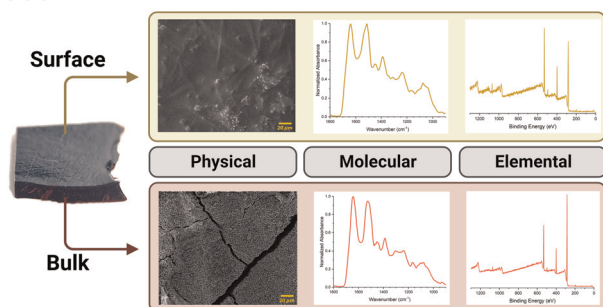
Quantitative imaging of trace elements in solid samples by online isotope dilution laser ablation-inductively coupled plasma-mass spectrometry

Kayo Yanagisawa, Makoto Matsueda, Makoto Furukawa, Hiroko Ishiniwa, Toshihiro Wada, Takafumi Hirata and Yoshitaka Takagai*



PAPERS

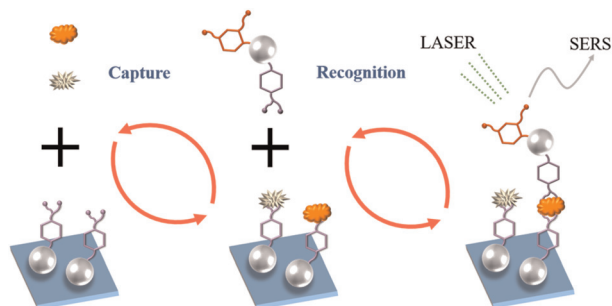
4300



Elemental and molecular characterization of degrading blood pools

Erin Giroux,* Iraklii I. Ebralidze and Theresa E. Stotesbury*

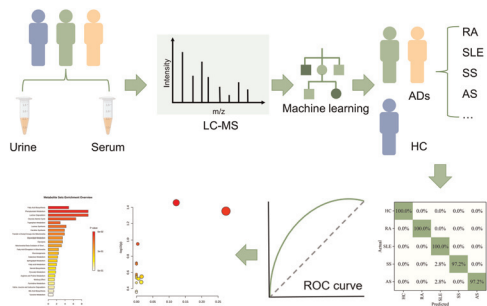
4310



Glucose sandwich assay based on surface-enhanced Raman spectroscopy

Tingting Zhang, Rui Lu,* Gongying Wang, Xiuyun Sun, Jiansheng Li and Boris Mizaikoff*

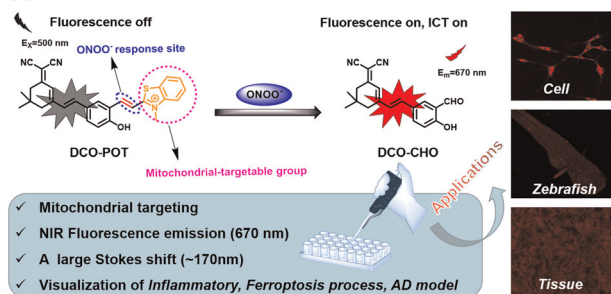
4318



Machine learning encodes urine and serum metabolic patterns for autoimmune disease discrimination, classification and metabolic dysregulation analysis

Qiuyao Du, Xiao Wang, Junyu Chen, Yiran Wang, Wenlan Liu, Liping Wang, Huihui Liu,* Lixia Jiang* and Zongxiu Nie*

4331



A large Stokes shift NIR fluorescent probe for visual monitoring of mitochondrial peroxynitrite during inflammation and ferroptosis and in an Alzheimer's disease model

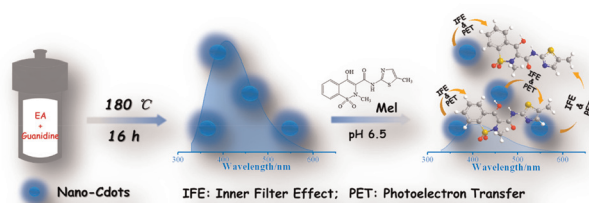
Shiying Chen, Wei Huang, Hongli Tan, Guoxing Yin, Shengyou Chen, Kuicheng Zhao, Yinghui Huang, Youyu Zhang, Haitao Li and Cuiyan Wu*



4339

An eco-friendly fluorometric assay for high-sensitive meloxicam quantitation in biological matrices

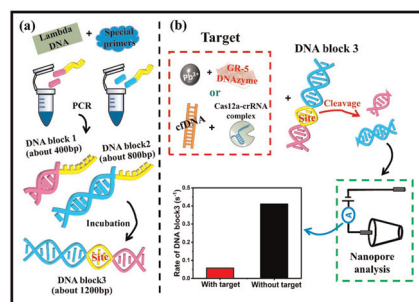
Zhong-Xia Wang, Kai-Qi Liu, Xiang-Ying Meng,*
Feng Li, Heng-Ye Li, Hang Gao* and Wei Wang*



4346

A novel design of DNA duplex containing programmable sensing sites for nanopore-based length-resolution reading and applications for Pb²⁺ and cfDNA analysis

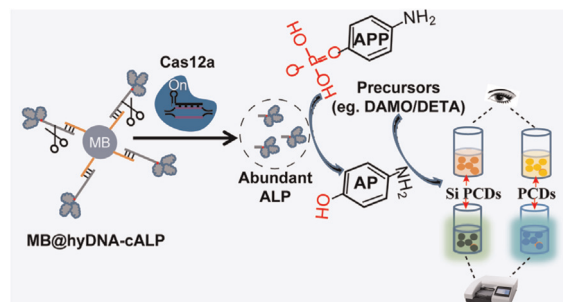
Jiahai Wang, Cenlin Gui, Jianji Zhu, Baian Zhu,
Zhuobin Zhu, Xiwen Jiang and Dagi Chen*



4356

A one-tube dual-readout biosensor for detection of nucleic acids and non-nucleic acids using CRISPR-ALP tandem assay

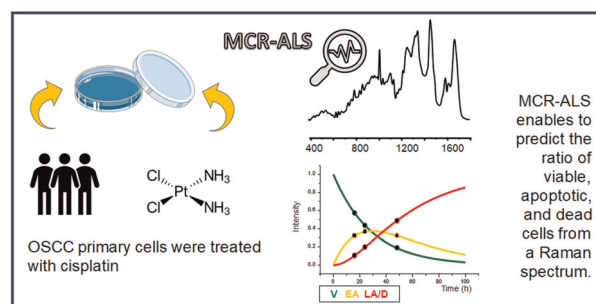
Xinxin Ke, Yi Hu, Chuanxia Chen* and Tao Hu*



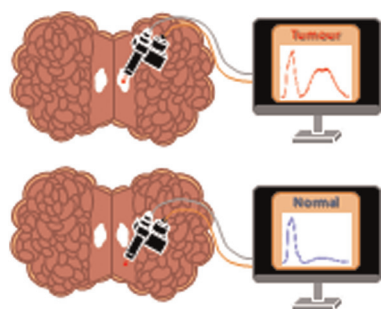
4365

Multivariate curve Resolution-Alternating least squares coupled with Raman microspectroscopy: new insights into the kinetic response of primary oral squamous carcinoma cells to cisplatin

Valentina Notarstefano,* Alessia Belloni, Paolo Mariani,
Giulia Orilisi, Giovanna Orsini, Elisabetta Giorgini* and
Hugh J. Byrne



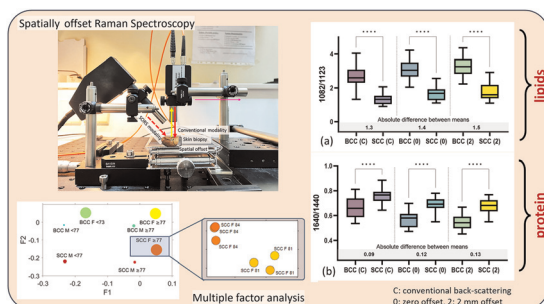
4373



High wavenumber Raman spectroscopy for intraoperative assessment of breast tumour margins

Jennifer Haskell, Thomas Hubbard, Claire Murray, Benjamin Gardner, Charlotte Ives, Douglas Ferguson and Nick Stone*

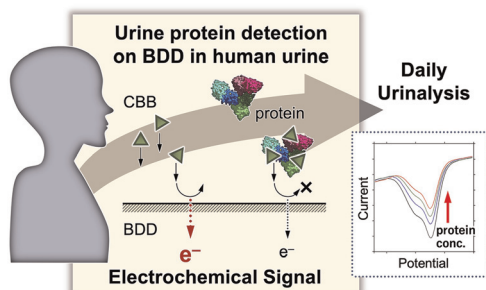
4386



Towards non-invasive monitoring of non-melanoma skin cancer using spatially offset Raman spectroscopy

Martha Z. Vardaki,* Eleftherios Pavlou, Nikolaos Simantiris, Evangelia Lampri, Konstantinos Seretis and Nikolaos Kourkoumelis

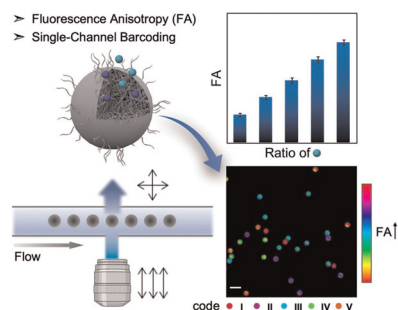
4396



Urine protein quantification in human urine on boron-doped diamond electrodes based on the electrochemical reaction of Coomassie brilliant blue

Hiroshi Aoki,* Risa Miyazaki, Miho Ohama, Michio Murata, Kai Asai, Genki Ogata and Yasuaki Einaga*

4406



Expanded single-color barcoding in microspheres with fluorescence anisotropy for multiplexed biochemical detection

Wenyu Huang, Yu Cheng, Jingying Zhai, Yuemin Qin, Weian Zhang and Xiaojiang Xie*

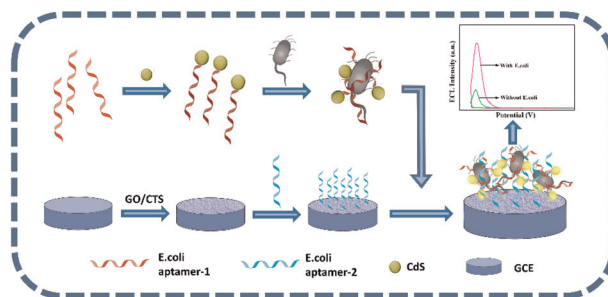


PAPERS

4414

An extracellular electron transfer enhanced electrochemiluminescence aptasensor for *Escherichia coli* analysis

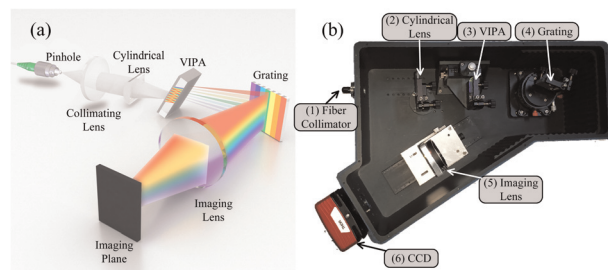
Xinyi Zhong, Yuan Deng, Qiling Yang, Sirui Yi, Haiyan Qiu, Lanlan Chen and Shanwen Hu*



4421

A broadband picometer resolution visible CCD spectrometer based on virtually imaged phased array technology

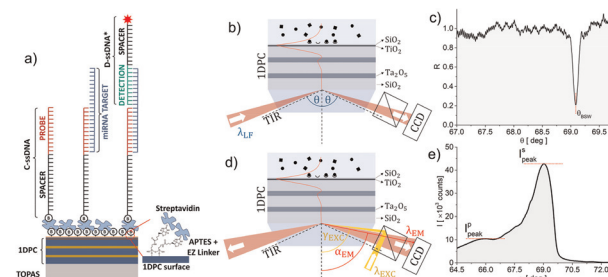
Hao Zhou, Weixiong Zhao,* Bo Fang, Bingxuan Lv, Weihua Cui, Weijun Zhang* and Weidong Chen



4429

Enhanced fluorescence detection of miRNA by means of Bloch surface wave-based biochips

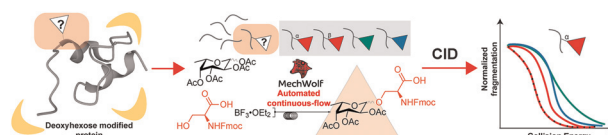
Agostino Occhicone,* Francesco Michelotti, Paola Rosa, Daniele Chiappetta, Tommaso Pileri, Paola Del Porto, Norbert Danz, Peter Munzert, Giuseppe Pignataro and Alberto Sinibaldi



4438

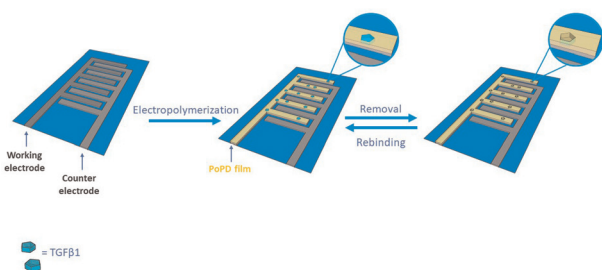
An identification method to distinguish monomeric sugar isomers on glycopeptides

Ashley E. DeYong, Jonathan C. Trinidad* and Nicola L. B. Pohl*



PAPERS

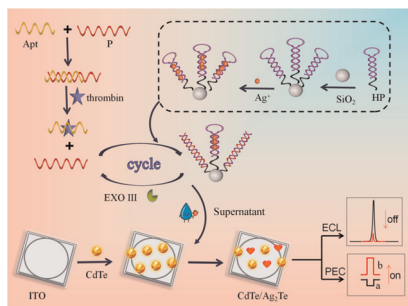
4447



Development of an MIP based electrochemical sensor for TGF-β1 detection and its application in liquid biopsy

Giulia Siciliano,* Maria Serena Chiriaco, Francesco Ferrara, Antonio Turco, Luciano Velardi, Maria Assunta Signore, Marco Esposito, Giuseppe Gigli and Elisabetta Primiceri*

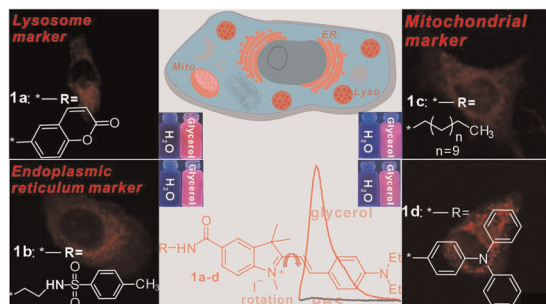
4456



A multifunctional electrochemiluminescence and photoelectrochemical biosensor based on a quantum dot ion-exchange reaction for two-channel detection of thrombin

Yali Xue, Wenshuai Dong, Bing Wang and Guifen Jie*

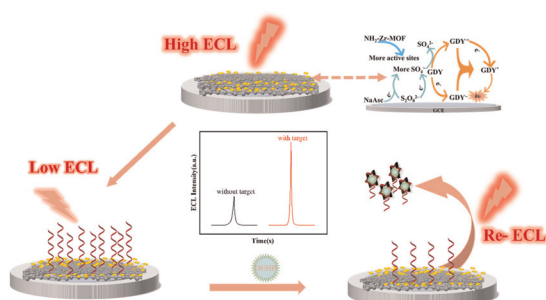
4463



Viscosity probes towards different organelles with red emission based on an identical hemicyanine structure

Hong-Jiao Liu, Ming-Sen Zhu, Gang Zhang, Ru Sun,* Yu-Jie Xu and Jian-Feng Ge*

4470



A metal–organic framework regulated graphdiyne-based electrochemiluminescence sensor with an electrocatalytic self-acceleration effect for the detection of di-(2-ethylhexyl) phthalate

Meihua Dong, Ding Jiang, Qianying Cao, Wenchang Wang, Hiroshi Shiigi and Zhidong Chen*

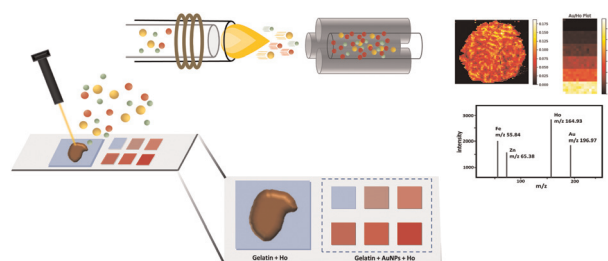


PAPERS

4479

Quantitative imaging of the sub-organ distributions of nanomaterials in biological tissues via laser ablation inductively coupled plasma mass spectrometry

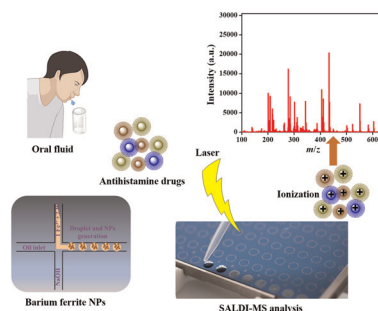
Teerapong Jantarat, Joshua D. Lauterbach, Jeerapat DOUNGCHAWEE, Dheeraj K. Agrohia and Richard W. Vachet*



4489

Continuous synthesis of BaFe₂O₄ and BaFe₁₂O₁₉ nanoparticles in a droplet microreactor for efficient detection of antihistamine drugs in oral fluid using surface-assisted laser desorption/ionization mass spectrometry

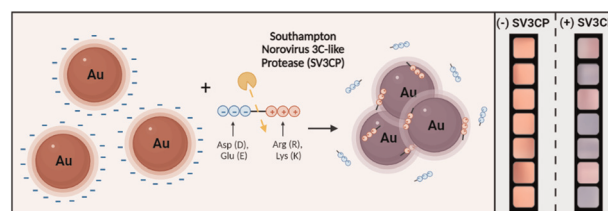
Mohamed O. Amin, Bessy D'Cruz and Entesar Al-Hetlani*



4504

An approach to zwitterionic peptide design for colorimetric detection of the Southampton norovirus SV3CP protease

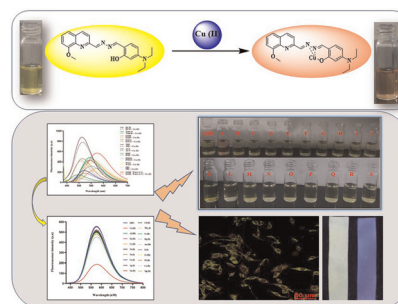
Justin Yeung, Zhicheng Jin, Chuxuan Ling, Maurice Retout, Elany Barbosa da Silva, Manan Damani, Yu-Ci Chang, Wonjun Yim, Anthony J. O'Donoghue and Jesse V. Jokerst*



4513

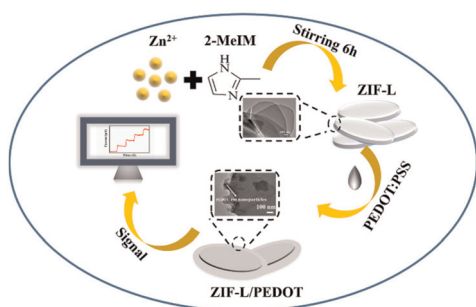
An ESIPT solvatochromic fluorescent and colorimetric probe for sensitive and selective detection of copper ions in environmental samples and cell lines

Kondakamarla Imran, Dheeraj Pandey, Jasleen Kaur, Saba Naqvi and Abha Sharma*



PAPERS

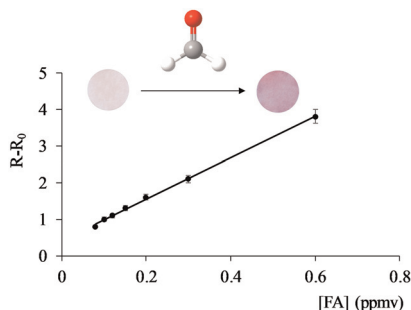
4525



Enhancing electrochemical properties of a two-dimensional zeolitic imidazole framework by incorporating a conductive polymer for dopamine detection

Jing Liu, Bing Yin,* Xiaobo Liu, Cheng Yang, Shiyu Zang and Shuo Wu*

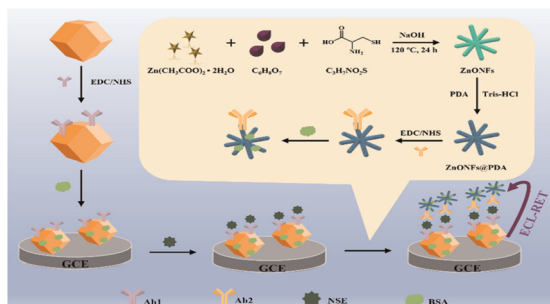
4533



An optical sensor for the sensitive determination of formaldehyde gas based on chromotropic acid and 4-aminoazobenzene immobilized in a hydrophilic membrane

M. D. Fernández-Ramos,* A. Moraga-Cabezas, Antonio L. Medina-Castillo* and L. F. Capitán-Vallvey

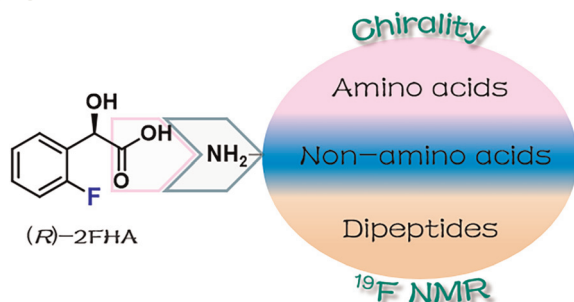
4539



Electrochemiluminescence resonance energy transfer between a Ru-ZnMOF self-enhanced luminophore and a double quencher ZnONF@PDA to detect NSE

Juan Yang, Dongmiao Qin, Na Wang, Yusheng Wu, Kanjun Fang and Biyang Deng*

4548



^{19}F NMR enantiodiscrimination and diastereomeric purity determination of amino acids, dipeptides, and amines

Lihua Xu, Qiong Wang, Yan Liu, Songsen Fu,* Yufen Zhao, Shaohua Huang* and Biling Huang*



CORRECTION

4557

Correction: Machine learning encodes urine and serum metabolic patterns for autoimmune disease discrimination, classification and metabolic dysregulation analysis

Qiuyao Du, Xiao Wang, Junyu Chen, Yiran Wang, Wenlan Liu, Liping Wang, Huihui Liu,* Lixia Jiang* and Zongxiu Nie*

