

# Journal of Materials Chemistry B

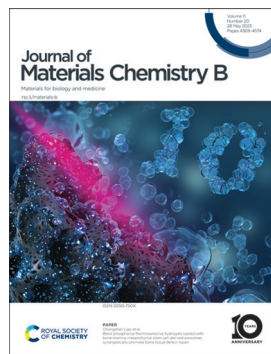
Materials for biology and medicine

[rsc.li/materials-b](https://rsc.li/materials-b)

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

## IN THIS ISSUE

ISSN 2500-750X CODEN JMCBDV 11(20) 4369–4574 (2023)



### Cover

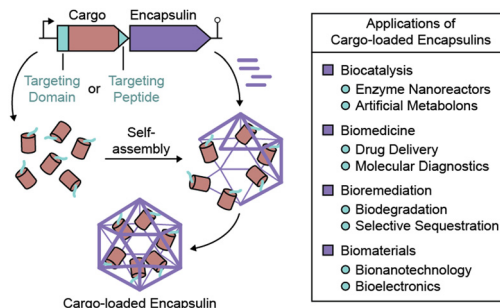
See Chongshan Liao *et al.*, pp. 4396–4407. Image reproduced by permission of Tong Xu and Chongshan Liao from *J. Mater. Chem. B*, 2023, **11**, 4396.

## REVIEW

4377

### Encapsulin cargo loading: progress and potential

Jesse A. Jones, Robert Benisch and Tobias W. Giessen\*

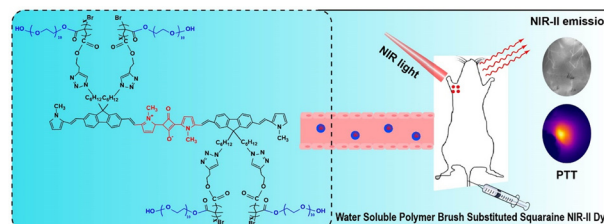


## COMMUNICATION

4389

### Water-soluble polymer brush-substituted squaraine NIR-II dye for efficient photothermal therapy

Xiaoli Li, Song Guo, Weixing Deng,\* Si Wu, Pengfei Sun\* and Yuanli Liu\*



## Editorial Staff

### Executive Editor

Michaela Mühlberg

### Deputy Editor

Geraldine Hay

### Editorial Production Manager

Jonathon Watson

### Senior Publishing Editor

Fiona Iddon

### Development Editor

Rose Wedgbury

### Publishing Editors

Eleanor Griffiths, Francesca Jacklin, Brian Li

### Editorial Assistant

Daniel Smith

### Publishing Assistant

Jane Paterson

### Publisher

Sam Keltie

For queries about submitted papers, please contact Jonathon Watson, Editorial Production Manager in the first instance. E-mail: [materialsB@rsc.org](mailto:materialsB@rsc.org)

For pre-submission queries please contact Michaela Mühlberg, Executive Editor. E-mail: [materialsB-rsc@rsc.org](mailto:materialsB-rsc@rsc.org)

Journal of Materials Chemistry B (electronic: ISSN 2050-7518) is published

48 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](mailto:orders@rsc.org)

2023 Annual (electronic) subscription price: £2192; \$3516.

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](http://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](mailto:advertising@rsc.org)

For marketing opportunities relating to this journal, contact [marketing@rsc.org](mailto:marketing@rsc.org)

# Journal of Materials Chemistry B

[rsc.li/materials-b](http://rsc.li/materials-b)

*Journal of Materials Chemistry A, B & C* cover high quality studies across all fields of materials chemistry. The journals focus on those theoretical or experimental studies that report new understanding, applications, properties and synthesis of materials. *Journal of Materials Chemistry B* covers materials with applications in biology and medicine.

## Editorial Board

### Editor-in-Chief

Jeroen Cornelissen, University of Twente, The Netherlands

### Associate Editors

Jiang Chang, Shanghai Institute of Ceramics, China  
Elizabeth Cosgriff-Hernandez, The

University of Texas at Austin, USA  
Gemma-Louise Davies, University College London, UK

Jian Ji, Zhejiang University, China  
Shaoqin Liu, Harbin Institute of Technology, China  
Yoshiko Miura, Kyushu University, Japan  
Marc in het Panhuis, University of

Wollongong, Australia  
Jessica Winter, The Ohio State University, USA

### Member

Claus Feldmann, Karlsruhe Institute of Technology, Germany

## Advisory Board

D. Benoit, University of Rochester, USA  
C. Bettinger, Carnegie Mellon University, USA  
W. Chan, University of Toronto, Canada  
K. Chatterjee, Indian Institute of Science, India  
H. Cölfen, University of Konstanz, Germany  
T. Da Ros, Trieste University, Italy  
T. Davis, Monash University, Australia  
T. Desai, University of California, San Francisco, USA  
X. Deng, Peking University, China  
E. Duguet, University of Bordeaux, France  
C. Fan, Shanghai Jiao Tong University, China  
Y. Fang, NCNST, China  
R. Forgan, University of Glasgow, UK  
J. Fu, Ningbo Institute of Industrial Technology, Chinese Academy of Sciences, China  
A. Gedanken, Bar-Ilan University, Israel  
M. Grunlan, Texas A&M University, USA  
Y. Gun'ko, Trinity College Dublin, Ireland  
J. van Hest, Radboud University Nijmegen, The Netherlands  
K. Hamad-Schifferli, University of Massachusetts Boston, USA  
B. Harley, University of Illinois, USA  
A. Higuchi, National Central University,

Chinese Taipei, and Wenzhou Medical University, China  
S. Inal, KAUST, Saudia Arabia  
Y. Ito, RIKEN, Japan  
B. Keselowsky, University of Florida, USA  
J. Khandare, MIT WPU Campus, India  
A. Kloxin, University of Delaware, USA  
N. Kotov, University of Michigan, USA  
Z.-C. Li, Peking University, China  
E. Lipke, Auburn University, USA  
L. Liz-Marzan, CIC biomaGUNE, Spain  
D. Lynn, University of Wisconsin, USA  
E. D.-L. Ma, Hong Kong Baptist University, Hong Kong  
G. Malliaras, University of Cambridge, UK  
H.-Q. Mao, Johns Hopkins University, USA  
S. Marchesan, University of Trieste, Italy  
D. Martin, University of Delaware, USA  
K. Masters, University of Wisconsin-Madison, USA  
A. Miserez, Nanyang Technological University, Singapore  
R. O'Reilly, University of Birmingham, UK  
A. Pannier, University of Nebraska, USA  
J. Park, KAIST, Korea  
S. Perrier, University of Warwick, UK  
X. Qu, Changchun Institute of Applied

Chemistry, Chinese Academy of Sciences, China  
M. Resmini, Queen Mary University of London, UK  
K. Schenke-Layland, NMI Natural and Medical Sciences Institute, University of Tübingen, Reutlingen, Germany  
C. Schmidt, University of Florida, USA  
L. Segatori, Rice University, USA  
T. Serizawa, Tokyo Institute of Technology, Japan  
Y. Shen, Zhejiang University, China  
S. Staniland, University of Sheffield, UK  
N. Steinmetz, University of California, San Diego, USA  
M. Stenzel, University of New South Wales, Australia  
M. Stevens, Imperial College London, UK  
S. Stoll, Georgetown Washington, USA  
L. Suggs, University of Texas at Austin, USA  
M. Takai, University of Tokyo, Japan  
J. Temenoff, Georgia Institute of Technology, USA  
P. Théato, Karlsruhe Institute of Technology, Germany  
R. Uljin, City University of New York, US  
J. Zheng, University of Akron, USA

## Information for Authors

Full details on how to submit material for publication in Journal of Materials Chemistry B 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/materials-b](http://rsc.li/materials-b). Submissions: The journal welcomes submissions of manuscripts for publication as Full Papers, Communications, Reviews, Highlights and Applications. Full Papers and Communications should describe original work of high quality and impact which must highlight the novel properties or applications (or potential properties/applications) of the materials studied.

Additional details are available from the Editorial Office or <http://www.rsc.org/authors>

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.

Registered charity number: 207890

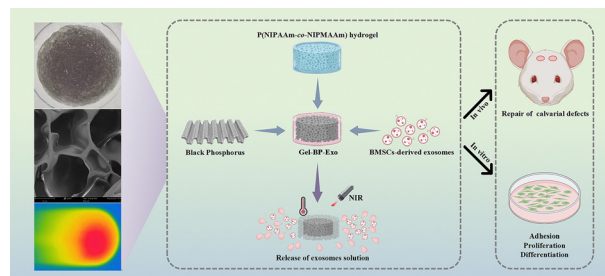


## PAPERS

4396

# Black phosphorus thermosensitive hydrogels loaded with bone marrow mesenchymal stem cell-derived exosomes synergistically promote bone tissue defect repair

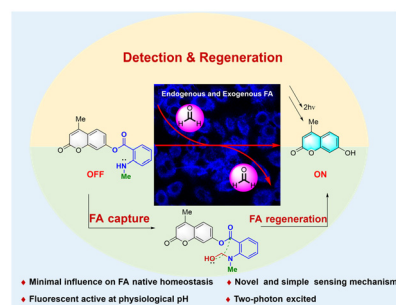
Tong Xu, Yongmei Hua, Peng Mei, Deliang Zeng, Shengjie Jiang and Chongshan Liao\*



4408

# A two-photon fluorescent probe for formaldehyde detection and regeneration in living cells

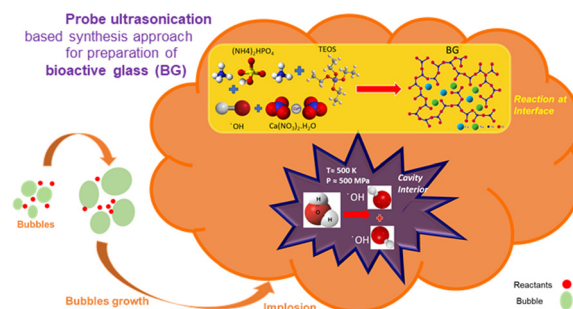
Qi Song, Zhiqiang Liu, Jie Niu, Bowen Zheng, Jingcheng Hao and Jie Jiang\*



4416

# Rapid wet chemical synthesis of bioactive glass with high yield by probe sonication

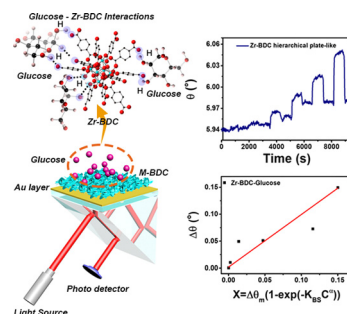
Asma Tufail Shah,\* Mehvish Zahoor, Nawshad Muhammad, Franz Kamutzki, Johannes Schmidt and Oliver Görke\*



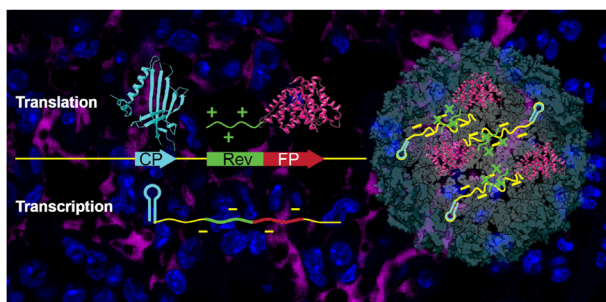
4428

# The revelation of glucose adsorption mechanisms on hierarchical metal–organic frameworks using a surface plasmon resonance sensor

Gilang Gumilar,\* Silvia Chowdhury, Ganes Shukri, Aep Patah, Nugraha Nugraha, Joel Henzie, Isa Anshori, Yusuf Valentino Kaneti and Brian Yulianto\*



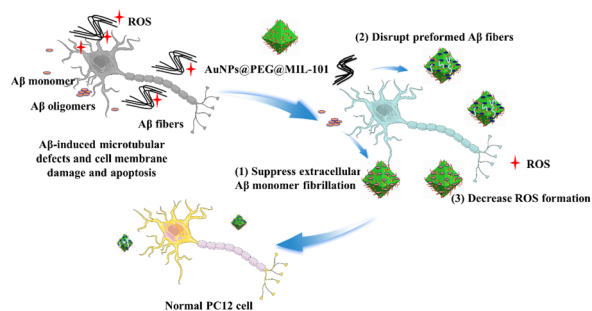
4445



### Self-assembly of a fluorescent virus-like particle for imaging in tissues with high autofluorescence

Ikeda Trashi, Mateusz Z. Durbacz, Orikeda Trashi, Yalini H. Wijesundara, Ryanne N. Ehrman, Alyssa C. Chiev, Cary B. Darwin, Fabian C. Herbert, Jashkaran Gadhvi, Nicole J. De Nisco, Steven O. Nielsen and Jeremiah J. Gassensmith\*

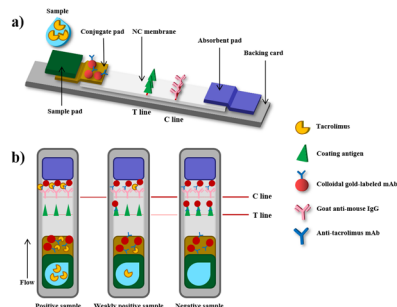
4453



### Electrostatic assembly of gold nanoparticle and metal–organic framework nanoparticles attenuates amyloid $\beta$ aggregate-mediated neurotoxicity

Licong Yang, Yutong Chen, Zhi Jia, Xiaoyu Yuan and Jie Liu\*

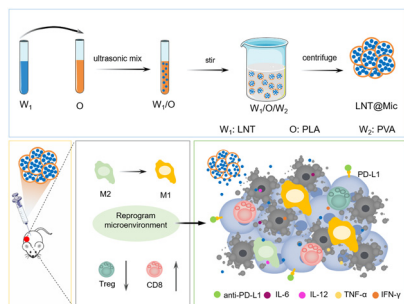
4464



### A gold-based immunochromatographic strip for the specific detection of tacrolimus in whole blood

Xiaoqian Jiang, Xinxin Xu, Hua Kuang, Liqiang Liu, Liguang Xu, Aihua Qu\* and Chuanlai Xu\*

4475



### Lentinan-laden microspheres reprogram the tumor microenvironment and improve anti-PD-L1 efficacy

Haixin Wang, Xiao-Dong Gao\* and Hua Yue\*

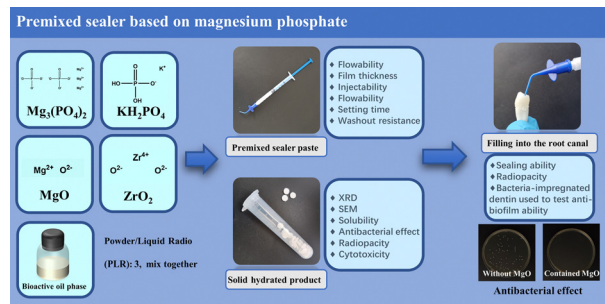


## PAPERS

4485

### A premixed magnesium phosphate-based sealer with anti-biofilm ability for root canal filling

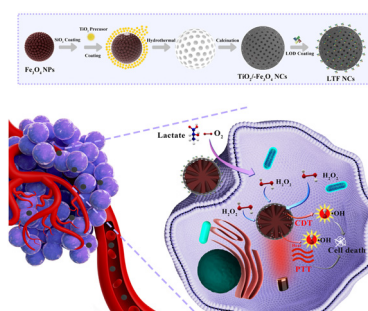
Dongjing Xu, Jiawei Liu, Honglian Dai,\* Jinyong Zhang, Wen Hou, Xiaopei Wu and Yanan Zhao



4498

### A small pore black TiO<sub>2</sub>/-large pore Fe<sub>3</sub>O<sub>4</sub> cascade nanoreactor for chemodynamic/photothermal synergetic tumour therapy

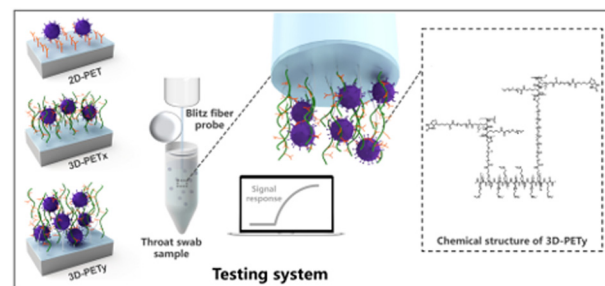
Yali Shi, Wenya Chang, Liying Zhao, Jiaqi Zhang, Yumeng Yue, Zhuoying Xie\* and Dawei Deng\*



4511

### Rational design of multivalent biosensor surfaces to enhance viral particle capture

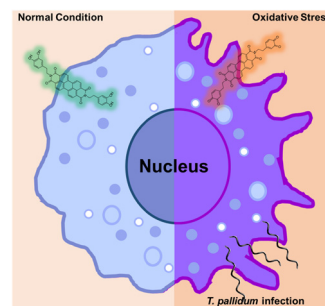
Wenwei Pan, Ziyu Han, Ye Chang, Xu Yan, Feng Zhou, Sihong Shen and Xuexin Duan\*



4523

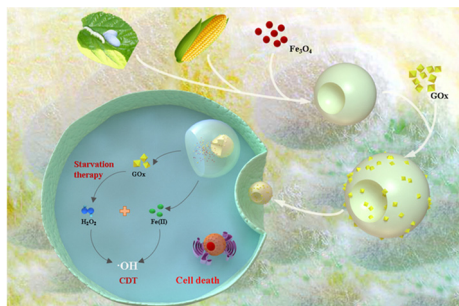
### A tunable fluorescent probe for superoxide anion detection during inflammation caused by *Treponema pallidum*

Weiqliang Lin, Jialin Huang, Shuang Guo, Meijiao Zhao, Xu Chen, Qiuping Shang, Ruoyuan Zhang, Guangfu Liao,\* Judun Zheng\* and Yuhui Liao\*





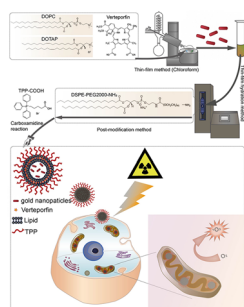
4529



### Enzyme/inorganic nanoparticle dual-loaded animal protein/plant protein composite nanospheres and their synergistic effect in cancer therapy

Qiaolin Chen, Mi Wu, Jinrong Yao, Zhengzhong Shao and Xin Chen\*

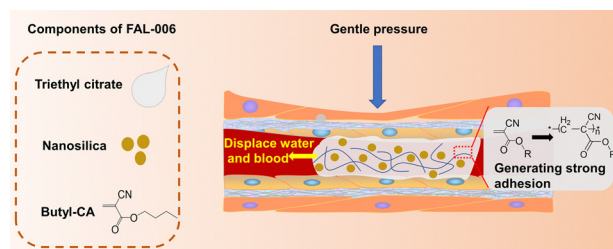
4539



### An X-ray activatable gold nanorod encapsulated liposome delivery system for mitochondria-targeted photodynamic therapy (PDT)

Xuefan Gu, Tiantian Shu, Wei Deng, Chao Shen and Youshen Wu\*

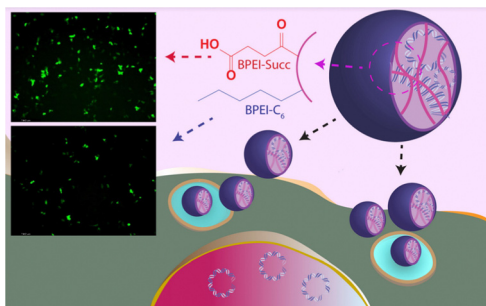
4548



### A cyanoacrylate/triethyl citrate/nanosilica-based closure glue with wet-adhesion capability for treatment of superficial varicose veins

Jia Wang, Xia Tian, Wei Zhang, Xiao Dong, Zhanguang Wang, Shiyuan Wang, Yonghan Liang, Wei Wang,\* Liang Xu\* and Yunlan Li\*

4556



### Balancing gene transfection and cytotoxicity of nucleic acid carriers with focus on ocular and hepatic disorders: evaluation of hydrophobic and hydrophilic polyethyleneimine derivatives

Fernando A. de Oliveira, Lindomar J. C. Albuquerque, Michelle Nascimento-Sales, Marcelo A. Christoffolete, Ismael C. Bellettini and Fernando C. Giacomelli\*

