

# 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.

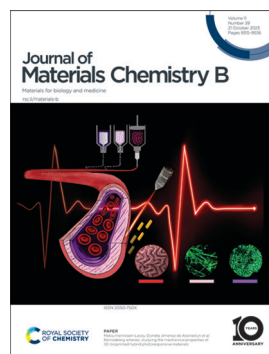
## IN THIS ISSUE

ISSN 2050-750X CODEN JMCBDV 11(39) 9315–9556 (2023)



### Cover

See Gregg A. Duncan *et al.*, pp. 9419–9430. Image reproduced by permission of Gregg A. Duncan from *J. Mater. Chem. B*, 2023, 11, 9419.



### Inside cover

See Malou Henriksen-Lacey, Dorleta Jimenez de Aberasturi *et al.*, pp. 9431–9442. Image reproduced by permission of Dorleta Jimenez de Aberasturi from *J. Mater. Chem. B*, 2023, 11, 9431.

## EDITORIAL

9323

### Introduction to microneedles

Ryan Donnelly, Ester Caffarel-Salvador, Harvinder Gill and Hyungil Jung

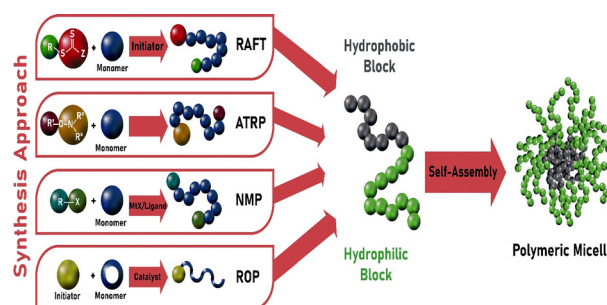


## REVIEWS

9325

### Synthesis approaches of amphiphilic copolymers for spherical micelle preparation: application in drug delivery

Ali Aliabadi, Maliheh Hasannia, Masoume Vakili-Azghandi, Fatemeh Araste, Khalil Abnous, Seyed Mohammad Taghdisi, Mohammad Ramezani\* and Mona Alibolandi\*



## Editorial Staff

### Executive Editor

Michaela Mühlberg

### Deputy Editor

Geraldine Hay

### Editorial Production Manager

Jonathon Watson

### Senior Publishing Editor

Fiona Iddon

### Development Editor

Natalie Cotterell

### 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

Kaushik Chatterjee, Indian Institute of Science, India  
Elizabeth Cosgriff-Hernandez, The

University of Texas at Austin, USA  
Gemma-Louise Davies, University of Birmingham, UK  
Håkan Engqvist, Uppsala University, Sweden  
Jian Ji, Zhejiang University, China  
Shaoqin Liu, Harbin Institute of Technology, China  
Yoshiko Miura, Kyushu University, Japan

Jessica Winter, The Ohio State University, USA  
Chengzhong Yu, University of Queensland, Australia

### 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  
J. Chang, Shanghai Institute of Ceramics, China  
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  
M. in het Panhuis, University of Wollongong, Australia  
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. Stugs, 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

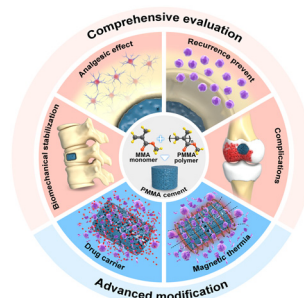


## REVIEWS

9369

### Comprehensive evaluation and advanced modification of polymethylmethacrylate cement in bone tumor treatment

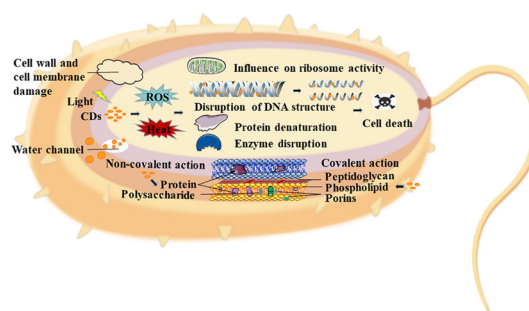
Bo Chao, Jianhang Jiao, Lili Yang, Yang Wang, Tong Yu, He Liu, Han Zhang, Mufeng Li, Wenjie Wang, Xiangran Cui, Shangyu Du, Zhonghan Wang\* and Minfei Wu\*



9386

### Antibacterial functionalized carbon dots and their application in bacterial infections and inflammation

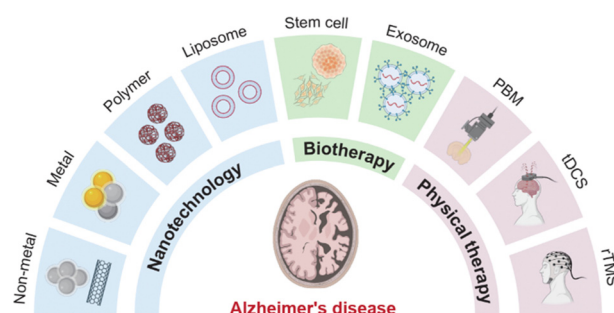
Meng Fang, Liping Lin,\* Muyue Zheng, Wei Liu and Rongguang Lin



9404

### Current emerging novel therapies for Alzheimer's disease and the future prospects of magneto-mechanical force therapy

Yajing Shen, Meng Wang, Shutang Li and Jinfei Yang\*

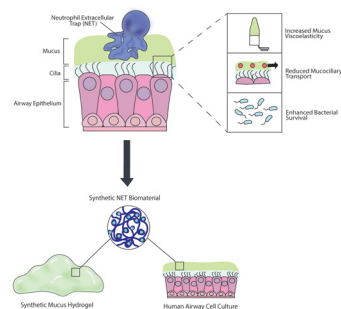


## PAPERS

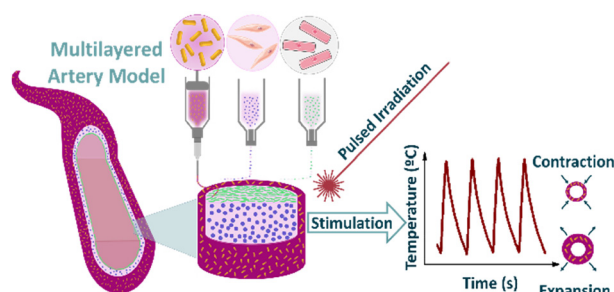
9419

### Engineering *in vitro* models of cystic fibrosis lung disease using neutrophil extracellular trap inspired biomaterials

Allison Boboltz, Sydney Yang and Gregg A. Duncan\*



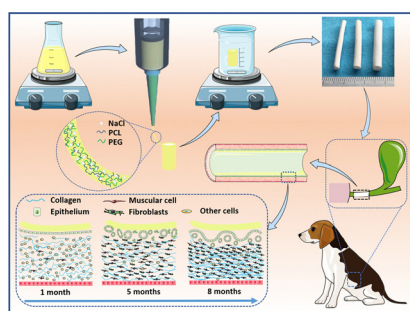
9431



### Remodeling arteries: studying the mechanical properties of 3D-bioprinted hybrid photoresponsive materials

Uxue Aizarna-Lopetegui, Clara García-Astrain, Carlos Renero-Lecuna, Patricia González-Callejo, Irune Villaluenga, Miguel A. del Pozo, Miguel Sánchez-Álvarez, Malou Henriksen-Lacey\* and Dorleta Jimenez de Aberasturi\*

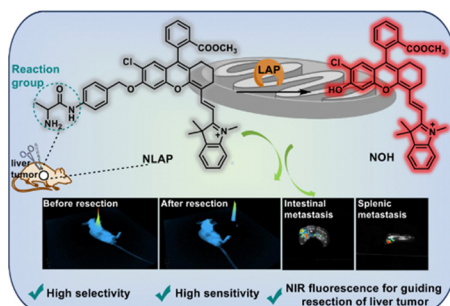
9443



### Fabrication of 3D printed PCL/PEG artificial bile ducts as supportive scaffolds to promote regeneration of extrahepatic bile ducts in a canine biliary defect model

Yu-Long Cai, Fang Nan, Guo-Tao Tang, Yuan Ma, Yi Ren, Xian-Ze Xiong, Rong-Xing Zhou, Fu-Yu Li, Nan-Sheng Cheng and Xia Jiang\*

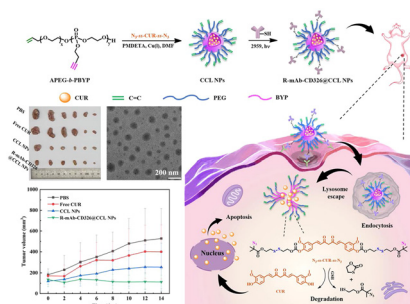
9459



### Engineering a near-infrared LAP fluorescent probe with high sensitivity and selectivity for surgical resection of liver cancer

Renfeng Jiang, Jiayu Zeng, Qian Liu, Songjiao Li,\* Longwei He\* and Dan Cheng\*

9467



### A CD326 monoclonal antibody modified core cross-linked curcumin-polyphosphoester prodrug for targeted delivery and cancer treatment

Haijiao Li, Mingzu Zhang, Jinlin He, Jian Liu, Xingwei Sun\* and Peihong Ni\*



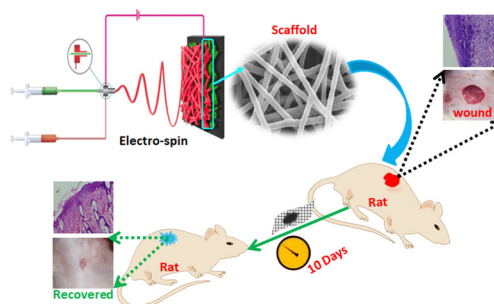


## PAPERS

9478

### Asymmetric fabrication and *in vivo* evaluation of the wound healing potency of electrospun biomimetic nanofibrous scaffolds based on collagen crosslinked modified-chitosan and graphene oxide quantum dot nanocomposites

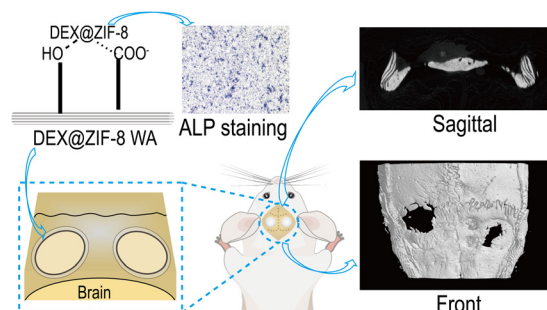
Koushik Dutta, Kunal Sarkar, Srikanta Karmakar, Bhuman Gangopadhyay, Arijita Basu, Sarbashri Bank, Sriparna De, Beauty Das,\* Madhusudan Das\* and Dipankar Chattopadhyay\*



9496

### Green synthesis of metal–organic framework loaded dexamethasone on wood aerogels for enhanced cranial bone regeneration

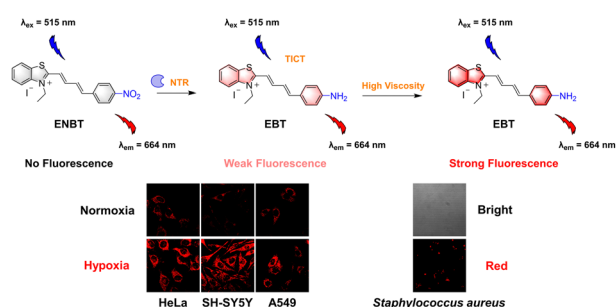
Zheng-Yang Chen, Rui-Deng Wang, Shi-Long Su, You-Liang Hao\* and Fang Zhou\*



9509

### A fluorescent probe for imaging nitroreductase with signal amplification in high-viscosity environments

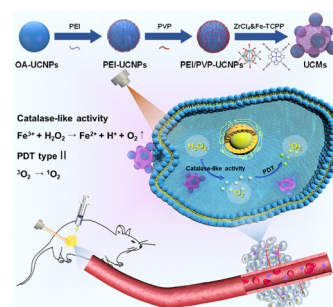
Yunfan Liu, Jiaying Li, Hongjin Huang and Yang Shu\*



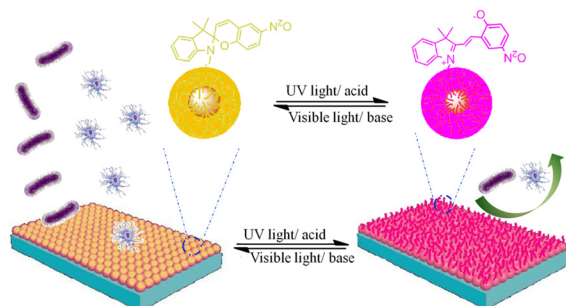
9516

### Dual ligand-assisted assembly of metal–organic frameworks on upconversion nanoparticles for NIR photodynamic therapy against hypoxic tumors

Xinyue Zhang, Jiasen Cui, Jinhui Liu, Xi Chen, Mingli Chen\* and Jianhua Wang\*



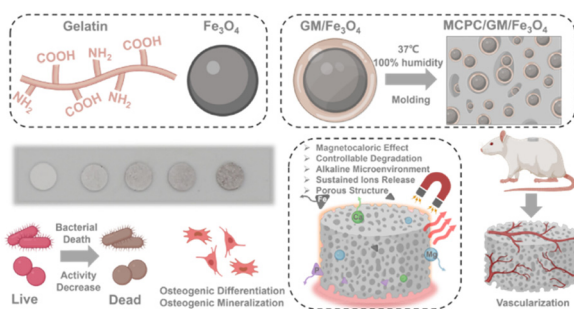
9525



### A spiropyran-decorated nanocoating for dynamically regulating bacteria/cell adhesion and detachment

Jie Li, Zhuang Ma, Anran Li, Siyuan Huang, Yufei Zhang, Yun Xue, Xianhui Song, Ye Zhang, Shihao Hong, Mo Wang,\* Zhongming Wu\* and Xinge Zhang\*

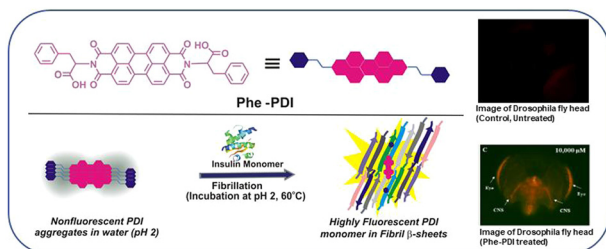
9532



### Multifunctional magnetocaloric bone cement with a time-varying alkaline microenvironment for sequential bacterial inhibition, angiogenesis and osteogenesis

Xiaokang Yao, Yanan Zhao, Wen Hou, Kai Huang, Manqi Yan, Rong Tu, Takashi Goto and Honglian Dai\*

9545



### Spectroscopic features of a perylenediimide probe for sensing amyloid fibrils: *in vivo* imaging of A $\beta$ -aggregates in a *Drosophila* model organism

Nilotpal Barooah, Puja Karmakar, M. K. Sharanya, Monalisa Mishra,\* Achikanath C. Bhasikuttan\* and Jyotirmayee Mohanty\*

