

Journal of Materials Chemistry B

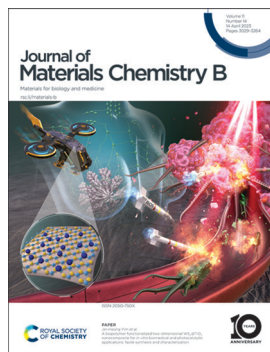
Materials for biology and medicine

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(14) 3029–3264 (2023)



Cover

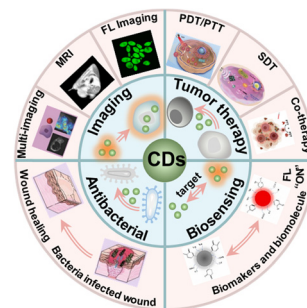
See Jin-Heong Yim
et al., pp. 3089–3096.
Image reproduced
by permission of
Jin-Heong Yim from
J. Mater. Chem. B,
2023, **11**, 3089.

REVIEWS

3038

Recent developments in carbon dots: a biomedical application perspective

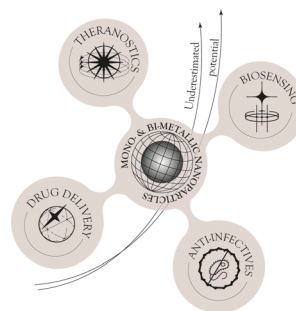
Le Tu, Qian Li, Sheng Qiu, Meiqin Li, Jinwoo Shin,
Pan Wu, Nem Singh, Junrong Li, Qihang Ding, Cong Hu,
Xiaoxing Xiong,* Yao Sun* and Jong Seung Kim*



3054

Monometallic and alloy nanoparticles: a review of biomedical applications

Elizaveta A. Koroleva, Ilya D. Shabalkin and
Pavel V. Krivoshapkin*



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

Blake Baker, 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

For pre-submission queries please contact Michaela Mühlberg, Executive Editor. E-mail: 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

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

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

Journal of Materials Chemistry B

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

Xiaogang Qu, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, China
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
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. Sezawa, 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. Sugis, 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. Ulijn, 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. 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

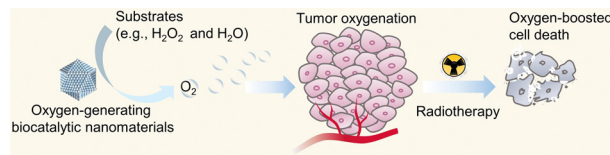


REVIEWS

3071

Oxygen-generating biocatalytic nanomaterials for tumor hypoxia relief in cancer radiotherapy

Yan Zu,* Ziyu Wang, Huiqin Yao* and Liang Yan

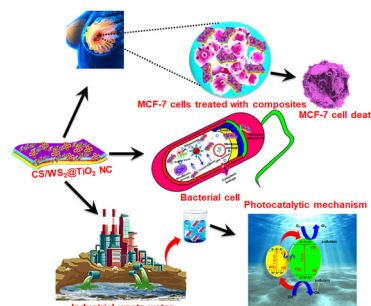


PAPERS

3089

A biopolymer functionalized two-dimensional WS₂@TiO₂ nanocomposite for *in vitro* biomedical and photocatalytic applications: facile synthesis and characterization

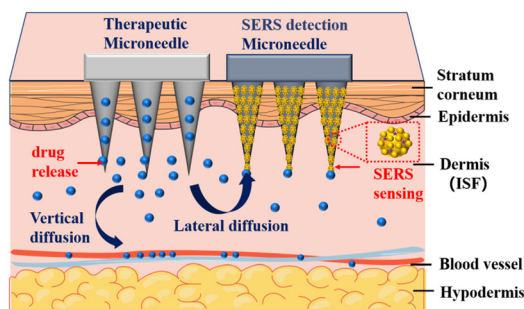
Kasirajan Kasinathan, Karunakaran Marimuthu, Selvam Samayanan and Jin-Heong Yim*



3097

Revealing drug release and diffusion behavior in skin interstitial fluid by surface-enhanced Raman scattering microneedles

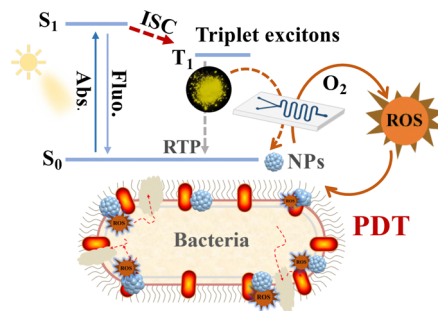
Shang Shi, Yunqing Wang,* Rongchao Mei, Xizhen Zhao, Xifang Liu and Lingxin Chen*



3106

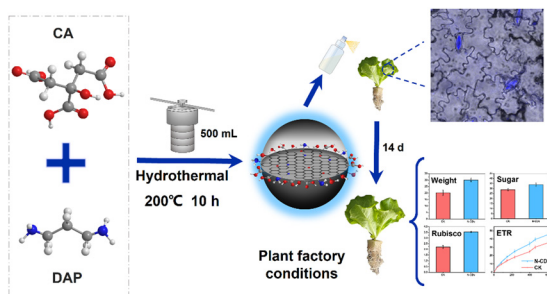
Microfluidic-based modulation of triplet exciton decay in organic phosphorescent nanoparticles for size-assisted photodynamic antibacterial therapy

Cong Chao, Lingling Kang, Wenbo Dai, Changsheng Zhao, Jianbing Shi, Bin Tong, Zhengxu Cai* and Yuping Dong*



PAPERS

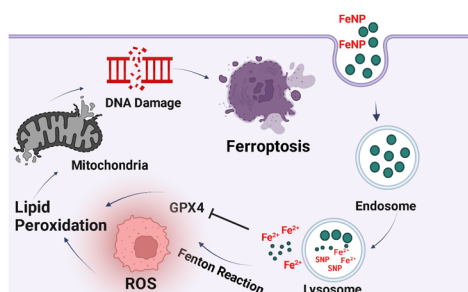
3113



Preparation of nitrogen-doped carbon dots and their enhancement on lettuce yield and quality

Jieqiang Tan, Shili Zhao, Junyu Chen, Xiaoqin Pan, Chen Li, Yingliang Liu, Caijuan Wu, Wei Li* and Mingtao Zheng*

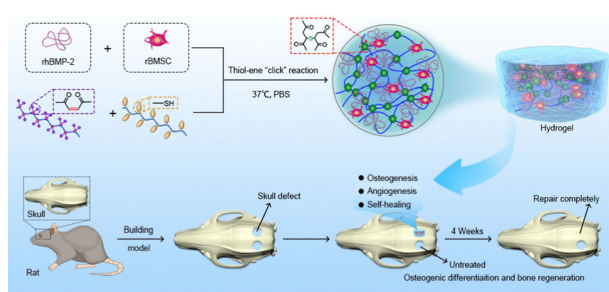
3124



Iron nitroprusside as a chemodynamic agent and inducer of ferroptosis for ovarian cancer therapy

Kanwal Asif, Muhammad Adeel,*
Md. Mahbubur Rahman,* Isabella Caligiuri, Tiziana Perin,
Maja Cemazar, Vincenzo Canzonieri and Flavio Rizzolio*

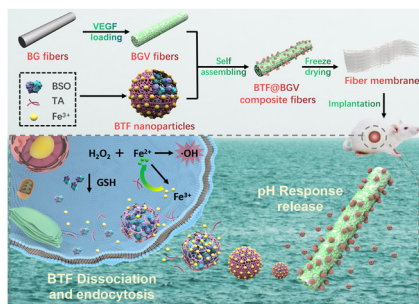
3136



Click-based injectable bioactive PEG-hydrogels guide rapid craniomaxillofacial bone regeneration by the spatiotemporal delivery of rhBMP-2

Weiwei Lao, Lijie Fan, Qiao Zhang, Chaoqian Lou,
Hang Li, Yanyan Li, Shuang Wu, Xiaojun Li,* Qiaojie Luo,*
Weipu Zhu and Xiaodong Li*

3151



An implantable composite scaffold for amplified chemodynamic therapy and tissue regeneration

Jiafei Chen, Shiqi Wan, Yike Fu, Yi Zhou,* Xiang Li* and Huiming Wang*

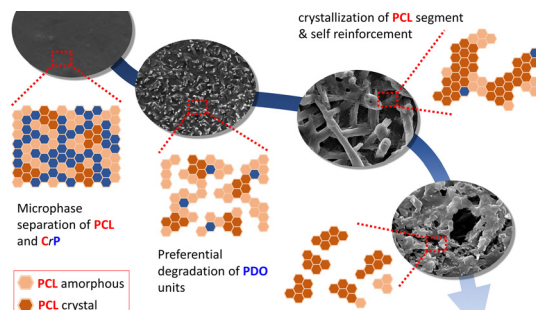


PAPERS

3164

Toward regulating biodegradation in stages of polyurethane copolymers with bicontinuous microphase separation

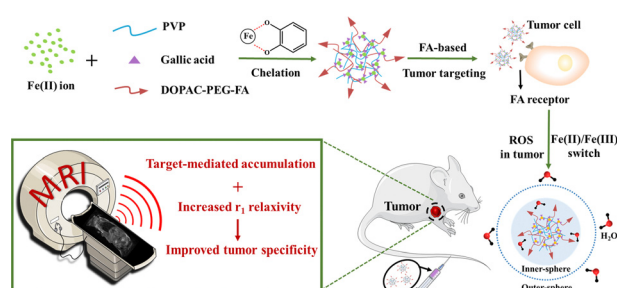
Man Wang, Hong-Ying Liu, Neng-Wen Ke,* Gang Wu, Si-Chong Chen* and Yu-Zhong Wang



3176

A tumor-targeting and ROS-responsive iron-based T₁ magnetic resonance imaging contrast agent for highly specific tumor imaging

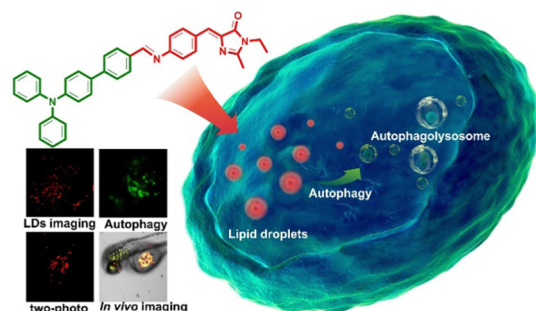
Jincong Yan, Zhongzhong Lu, Mingsheng Xu, Jihuan Liu, Ye Zhang, Jingbo Yin, Yi Cao* and Renjun Pei*



3186

Two-photon excited red-green "discoloration" bioprobes for monitoring lipid droplets and lipid droplet-lysosomal autophagy

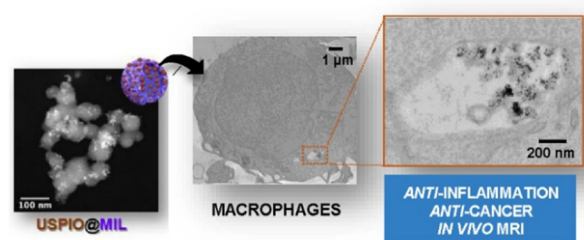
Ming-Xuan Liu, Li Xu, Peng-Fei Zhu, Xin Li, Miao Shan, Wei Jin, Jing Chen,* Yong Ling* and Xiao-Ling Zhang*



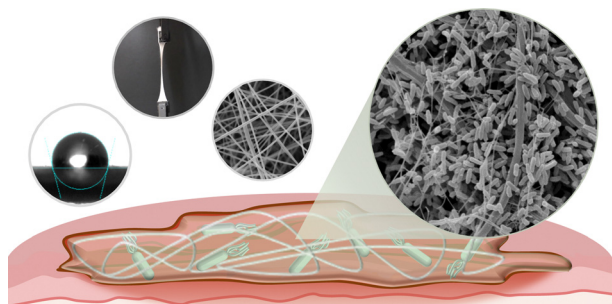
3195

Hierarchical superparamagnetic metal–organic framework nanovectors as anti-inflammatory nanomedicines

Heng Zhao, Saad Sene, Angelika M. Mielcarek, Sylvain Miraux, Nicolas Menguy, Dris Ihiwakrim, Ovidiu Ersen, Christine Péchoux, Nathalie Guillou, Joseph Scola, Jean-Marc Grenèche, Farid Nouar, Simona Mura, Florent Carn, Florence Gazeau, Eddy Dumas, Christian Serre* and Nathalie Steunou*



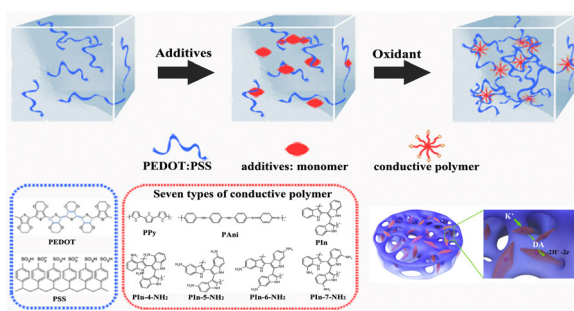
3212



Imitating the microenvironment of native biofilms using nanofibrous scaffolds to emulate chronic wound infections

Jana Wächter, Pia K Vestweber, Nathalie Jung and Maike Windbergs*

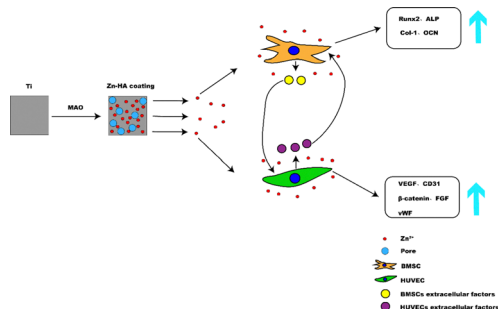
3226



PEDOT:PSS hydrogels with high conductivity and biocompatibility for *in situ* cell sensing

Taotao Yang, Ming Yang, Chao Xu, Kun Yang, Yuming Su, Yongqin Ye, Lingyun Dou, Qin Yang, Wenbo Ke,* Bin Wang* and Zhiqiang Luo*

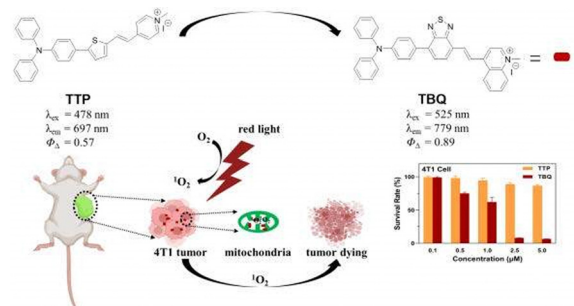
3236



A functional study of zinc–titanium coatings and exploration of the intrinsic correlation between angiogenesis and osteogenesis

Lei Yu, Yuanchen Yin, Zhaoyang Guo, Yifan Fei, Xutao Wen, Jiajia Wang, Haishui Sun, Jingzhou Hu* and Shanliang Jin*

3252



Molecular engineering to red-shift the absorption band of AIE photosensitizers and improve their ROS generation ability

Yuhui Zhang, Xiaohong Pan,* Haixing Shi, Yaqi Wang, Wenzhen Liu, Liangzhi Cai, Le Wang, Huanhuan Wang and Zhuo Chen*



RETRACTION

3262

Retraction: Electrodeposition of a porous strontium-substituted hydroxyapatite/zinc oxide duplex layer on AZ91 magnesium alloy for orthopedic applications

D. Gopi,* N. Murugan, S. Ramya and L. Kavitha

