

Materials Advances

An open access journal publishing across the breadth of materials science

rsc.li/materials-advances

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 2633-5409 CODEN MAADC9 5(12) 4947-5324 (2024)



Cover

See Björn K. Birdsong, Richard T. Olsson *et al.*, pp. 5041–5051. Image reproduced by permission of Richard T. Olsson from *Mater. Adv.*, 2024, 5, 5041.



Inside cover

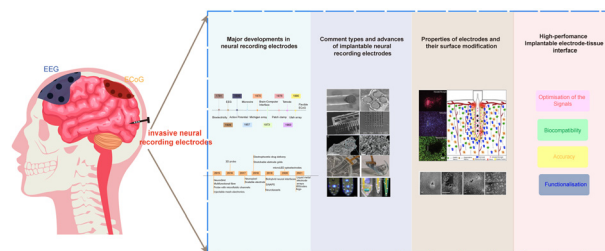
See Alireza Mashaghi *et al.*, pp. 5025–5035. Image reproduced by permission of Tom Evers and Alireza Mashaghi from *Mater. Adv.*, 2024, 5, 5025.

REVIEWS

4958

The past, present, and future of *in vivo*-implantable recording microelectrodes: the neural interfaces

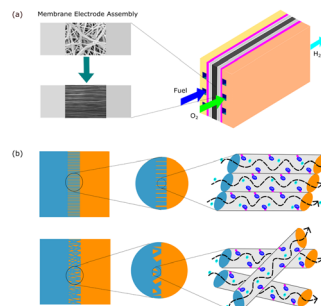
Kun Liu, Hao Zhang, Minghui Hu, Zifa Li, Kaiyong Xu, Dan Chen, Wenqiang Cui, Cui Lv, Ran Ding,* Xiwen Geng* and Sheng Wei*



4974

Insight into aligned nanofibers improving fuel cell performances: strategies, rationalities, and opportunities

Muhammad Yusro* and Viktor Hacker



RSC Advances

At the heart of open access for
the global chemistry community

Editor-in-chief

Russell J Cox

Leibniz Universität Hannover, Germany

We stand for:



Breadth We publish work in all areas of chemistry and reach a global readership



Affordability Low APCs, discounts and waivers make publishing open access achievable and sustainable



Quality Research to advance the chemical sciences undergoes rigorous peer review for a trusted, society-run journal



Community Led by active researchers, we publish quality work from scientists at every career stage, and all countries

Submit your work now

rsc.li/rsc-advances

@RSC_Adv

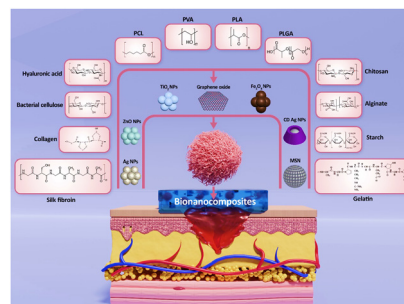


REVIEWS

4996

Innovative approaches in skin therapy: bionanocomposites for skin tissue repair and regeneration

Ayça Bal-Öztürk, Emine Alarçin, Gökçen Yaşayan, Meltem Avcı-Adali, Arezoo Khosravi, Atefeh Zarepour, Siavash Iravani* and Ali Zarrabi*

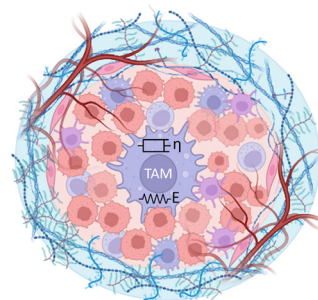


PERSPECTIVES

5025

Single-cell analysis of innate immune cell mechanics: an application to cancer immunology

Tom M.J. Evers, Antoinette van Weverwijk, Karin E. de Visser and Alireza Mashaghi*

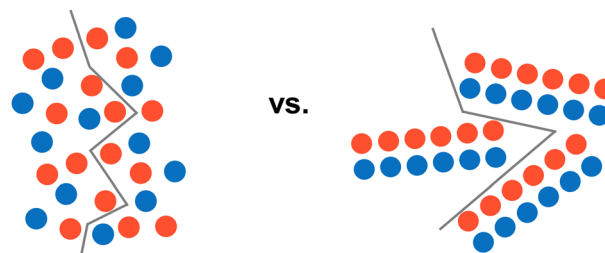


5036

What makes cements bind?—A proposal for a universal factor

Hoang Nguyen* and Paivo Kinnunen

Cement design

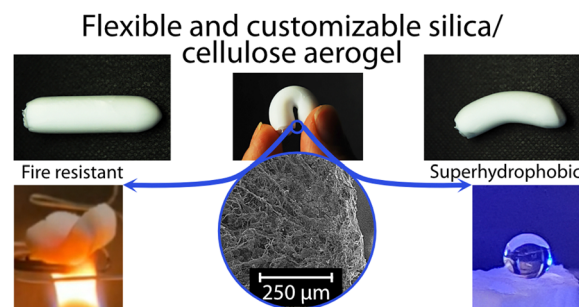


PAPERS

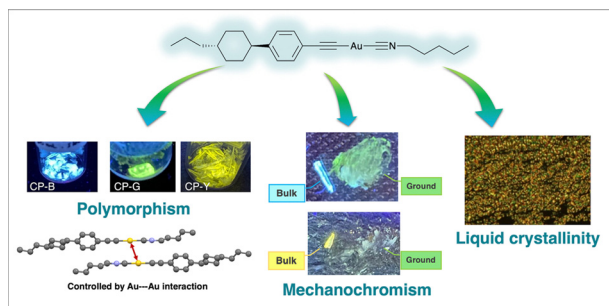
5041

Flexible and fire-retardant silica/cellulose aerogel using bacterial cellulose nanofibrils as template material

Björn K. Birdsong*, Qiong Wu, Mikael S. Hedenqvist, Antonio J. Capezza, Richard L. Andersson, Anna J. Svagan, Oisik Das, Rhoda Afriyie Mensah and Richard T. Olsson*



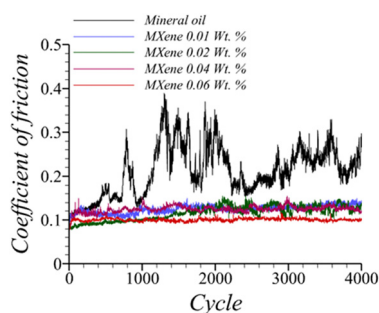
5052



Tricolour luminescence in an Au(I) complex controlled by polymorphism and mechanical stress

Andriani Furoida, Misato Daitani, Kohsuke Matsumoto, Kyohei Hisano and Osamu Tsutsumi*

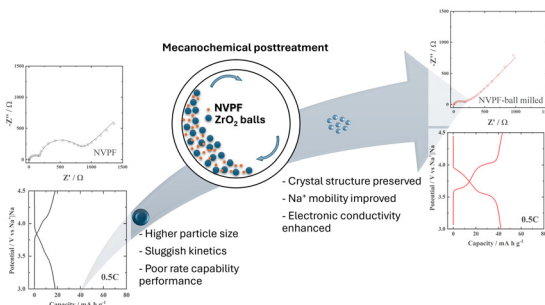
5063



Tribo-electrical evaluation of conductive fluid film of $Ti_3C_2T_z$ MXene-containing lubricant

Mohsen Tajedini, Kailash Arole, Zahra Ghasemi, Rouzhina Azhdari, Micah J. Green and Hong Liang*

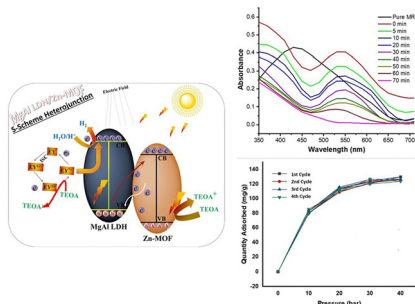
5070



Mechanochemical effect on the electrochemical properties of a $Na_3(VO)_2(PO_4)_2F$ positive electrode for sodium-ion batteries

William G. Morais,* Eduardo C Melo and Roberto M. Torresi*

5080



Multifunctional MgAl LDH/Zn-MOF S-scheme heterojunction: efficient hydrogen production, methyl red removal, and CO_2 adsorption

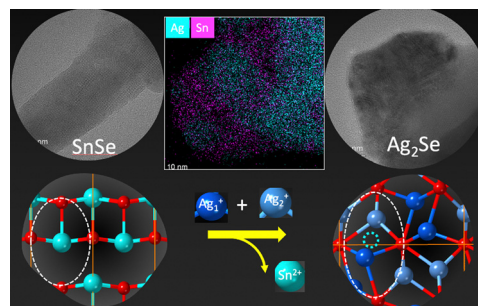
Ihsan Maseeh, Farheen Anwar, Sadia Aroob, Tariq Javed, Ismat Bibi, Afaf Almasoudi, Ahmad Raheel, Muhammad Arshad Javid, Sónia A. C. Carabineiro and Muhammad Babar Taj*



5096

Room temperature chemical transformation of SnSe to Ag₂Se nanocrystals via cation exchange

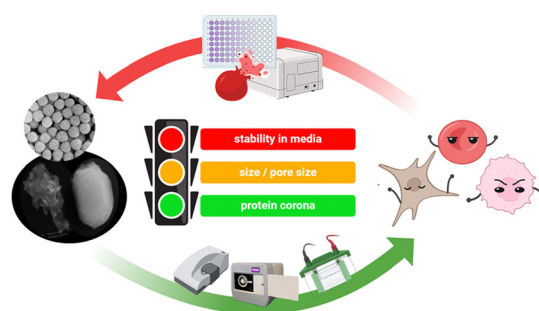
Yiqiao Huang and Pierre F. P. Poudeu*



5106

Understanding the impact of silica nanoparticles in cancer cells through physicochemical and biomolecular characterizations

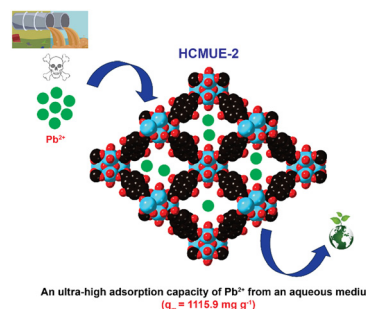
Asia Saorin, Alberto Martinez-Serra, Germán Jose Paporoni-Bruzual, Michele Crozzolin, Vincenzo Lombardi, Michele Back, Pietro Riello, Marco P. Monopoli and Flavio Rizzolio*



5118

Engineering of efficient functionalization in a zirconium-hydroxyl-based metal-organic framework for an ultra-high adsorption of Pb²⁺ ions from an aqueous medium: an elucidated uptake mechanism

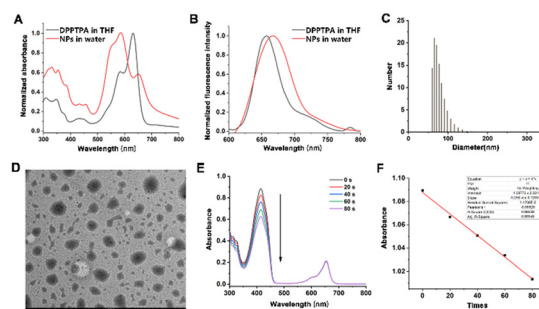
Hang M. N. Pham, Anh V. N. Phan, Anh N. T. Phan, Vi P. Nguyen, Khang M. V. Nguyen, Hung N. Nguyen, Thai M. Nguyen and My V. Nguyen*



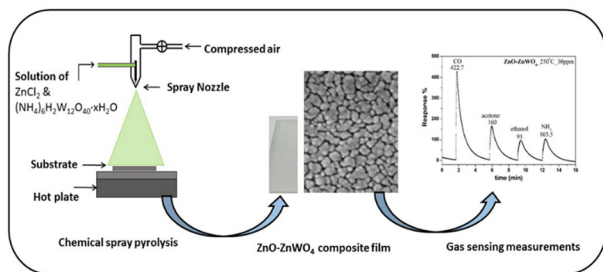
5134

A triphenylamine functionalized photosensitizer as a promising candidate for osteosarcoma cancer phototheranostics

Chongchong Yin, Xiaowen Bao, Jiaqi Li, Jianwei Zhu and Jisheng Sui*



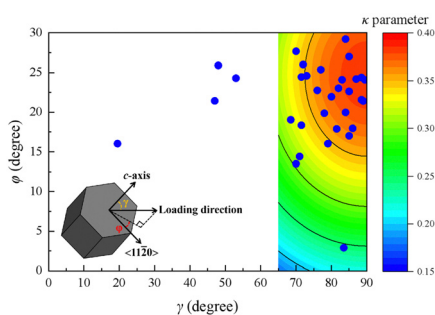
5140



Enhanced gas sensing performance of sprayed ZnO–ZnWO₄ toward CO gas

Mohamed H. Sayed, Tina Dilova, Genoveva Atanasova, Georgi Avdeev, Mostafa Boshta, Anna Og. Dikovska and Mohammed M. Gomaa*

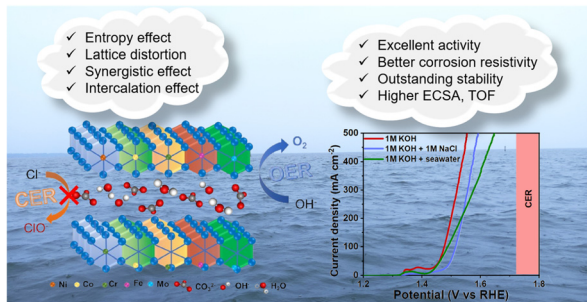
5148



$\langle 11\bar{2}0 \rangle$ -orientation-dependent crack initiation in a titanium alloy under dwell fatigue

Zhichun Zhou, Chao Fang, Binbin Jiang,* Jianke Qiu, Linglei Zhang, Jiafeng Lei, Rui Yang and Kui Du*

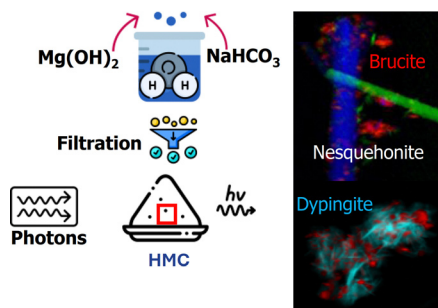
5156



High-entropy layered hydroxide for efficient and sustainable seawater oxidation

Santanu Pal, Sakila Khatun and Poulomi Roy*

5167



Characterization of hydrated magnesium carbonate materials with synchrotron radiation-based scanning transmission X-ray spectromicroscopy

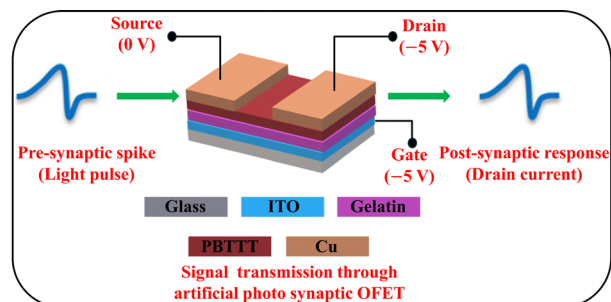
Md Thasfiqzaman,* Hoang Nguyen, Tuomas Mansikkala, Marko Huttula, Igor Beinik, Jörg Schwenke, Karina Thånell, Adam P. Hitchcock, Paivo Kinnunen and Minna Patanen*



5179

The human brain-inspired light-stimulated gelatin-biopolymer gated synaptic transistor for realizing cognitive activities

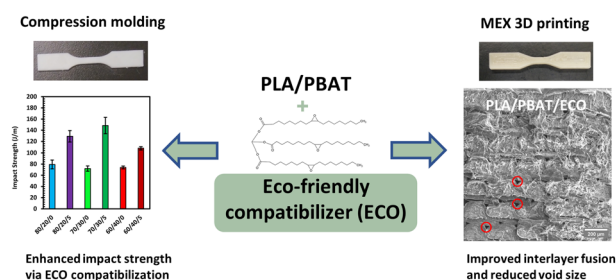
Bishwajit Mandal, M. Raveendra Kiran and Samarendra Pratap Singh*



5194

Compatibilization of PLA/PBAT blends with epoxidized canola oil for 3D printing applications

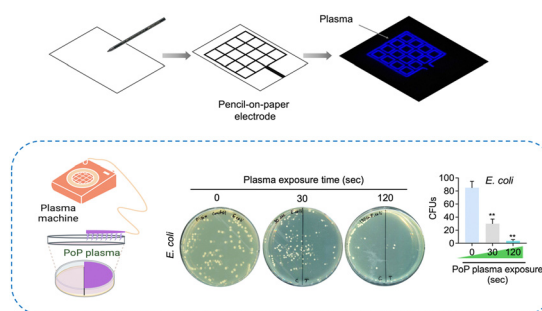
Mohamed Wahbi, Quintin Litke, David Levin, Song Liu, Kevin J. De France and Marianna Kontopoulou*



5204

Pencil-on-paper flexible DBD plasma for surface disinfection

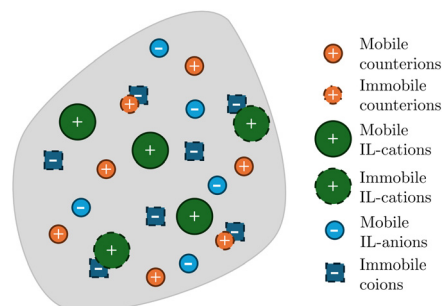
Neha Kaushik, Thuan Nguyen Dao, Minh Thu Nguyen, Shweta B. Borkar, Hoang Tung Nguyen, Le Thi Quynh Xuan, Tirtha Raj Acharya, Thanh Tung Nguyen, Eun Ha Choi, Nagendra Kumar Kaushik* and Linh Nhat Nguyen*



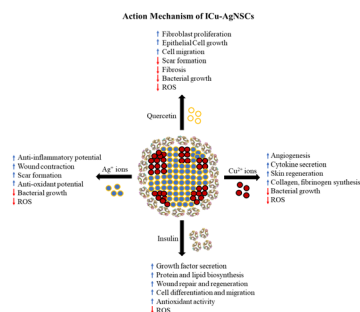
5213

A multi-cation model for the actuation of ionic membranes with ionic liquids

Alain Boldini



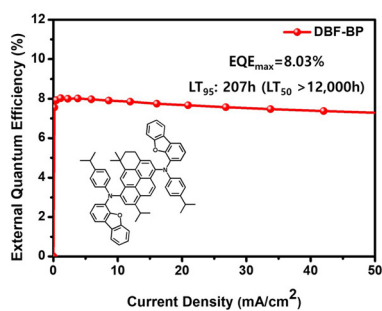
5231



Insulin-infused bimetallic nano-subclusters as a multifunctional agent for ROS scavenging, antibacterial resilience, and accelerated *in vitro* cell migration

Deepinder Sharda and Diptiman Choudhury*

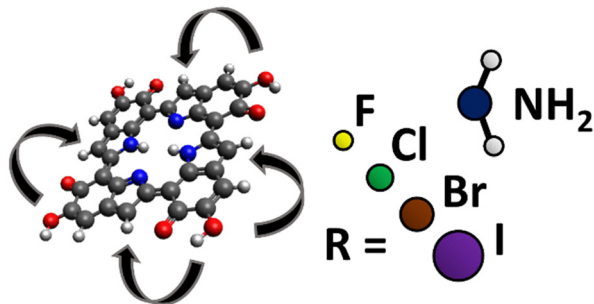
5244



Improving high efficiency and device lifetime of blue emitters with 3H-benzo[cd]pyrene core and optimized bulky side groups

Hyukmin Kwon, Sunwoo Park, Seokwoo Kang, Sangwook Park, Kiho Lee, Hayoon Lee and Jongwook Park*

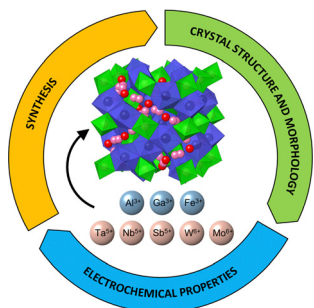
5251



Tuning melanin: theoretical analysis of functional group impact on electrochemical and optical properties

Florian Heppner, Noah Al-Shamery, Pooi See Lee and Thomas Bredow*

5260



Supervalent doping and its effect on the thermal, structural and electrochemical properties of Li₇La₃Zr₂O₁₂ solid electrolytes

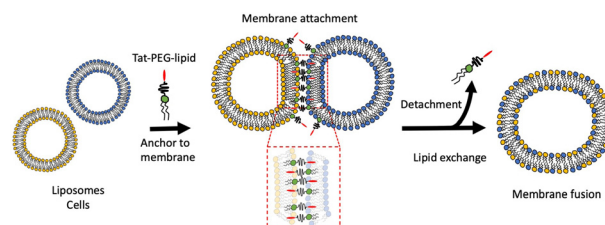
Janez Košir, Seyedabolfazl Mousavihashemi, Milla Suominen, Anna Kobets, Benjamin P. Wilson, Eeva-Leena Rautama and Tanja Kallio*



5275

Cell membrane fusion induced by surface modification with cell-penetrating peptide–lipid conjugates that facilitates close contact between distinct membranes

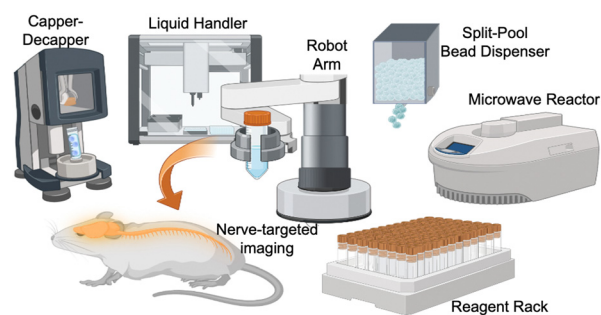
Yuya Sato, Teruhiko Baba, Takeyuki Uchida, Ung-il Chung and Yuji Teramura*



5290

A robotic system for automated chemical synthesis of therapeutic agents

Kai Bao, Jong Seo Yoon, Sung Ahn, Jeong Heon Lee, Conor J. Cross, Myung Yung Jeong,* John V. Frangioni* and Hak Soo Choi*



5298

Ionic liquid-based chemodosimetric probe: the selective detection and removal of bisulfite from a pure aqueous system and potential uses in biosensing

Nishu Choudhary, Sanjay Yadav, Surjit Bhai, Vasavdutta Sonpal, Bishwajit Ganguly and Alok Ranjan Paital*



5307

Hydrothermal synthesis of an MoS₂/MnO₂ nanocomposite: a unique 3D-nanoflower/1D-nanorod structure for high-performance energy storage applications

Md. Roxy Islam, Mizanur Rahaman, Md. Muktedir Billah* and Muhammad Rakibul Islam*

