

Materials Advances

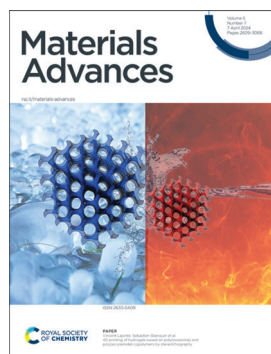
An open access journal publishing across the breadth of materials science

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.

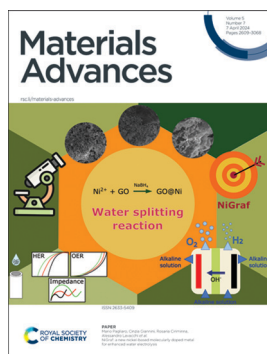
IN THIS ISSUE

ISSN 2633-5409 CODEN MAADC9 5(7) 2609-3068 (2024)



Cover

See Vincent Lapinte, Sebastien Blanquer *et al.*, pp. 2750–2758. Image reproduced by permission of Sebastien Blanquer and Vincent Lapinte from *Mater. Adv.*, 2024, 5, 2750.



Inside cover

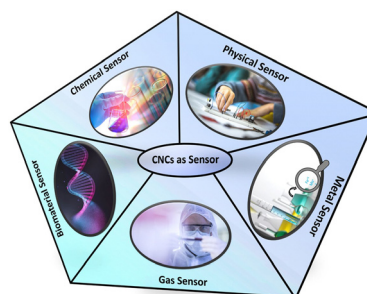
See Mario Pagliaro, Cinzia Giannini, Rosaria Ciriminna, Alessandro Lavacchi *et al.*, pp. 2759–2766. Image reproduced by permission of Mario Pagliaro from *Mater. Adv.*, 2024, 5, 2759.

REVIEWS

2622

Recent advances in cellulose nanocrystals-based sensors: a review

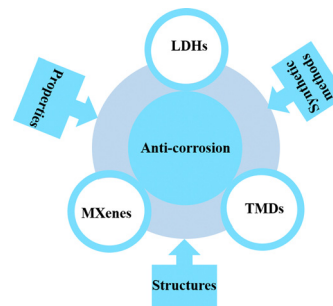
Shiva Singh, Shakshi Bhardwaj, Pragya Tiwari, Keshav Dev, Kaushik Ghosh and Pradip K. Maji*



2655

Anti-corrosion applications of 2D transition metal based layered materials

Yuqin Tian, Qiaoxin Yang, Wei Li, Yuan Gong, Qiuping Zhao, Chunlei Li* and Xinxin Sheng*



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

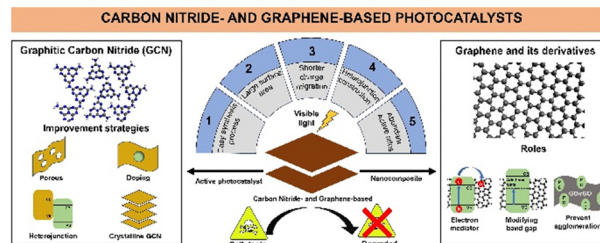


REVIEWS

2668

Carbon nitride- and graphene-based materials for the photocatalytic degradation of emerging water pollutants

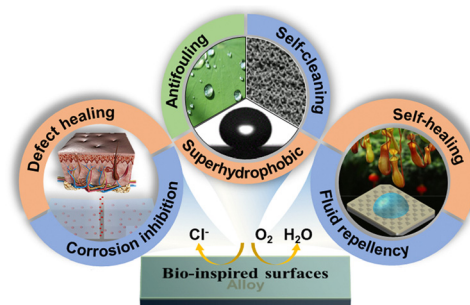
Indra Jaya Budiarmo, Valentinus Alphano Dabur, Riska Rachmanty, Hermawan Judawisastra, Chechia Hu and Arie Wibowo*



2689

Anti-corrosion properties of bio-inspired surfaces: a systematic review of recent research developments

Qingyun Ma, Qing Yang,* Jialiang Zhang, Fangzheng Ren, Chongxiao Xia and Feng Chen*



2719

Modifications of polyalkenoic acid and its effect on glass ionomer cement

Sreejith Sasidharan Lathikumari and Manju Saraswathy*

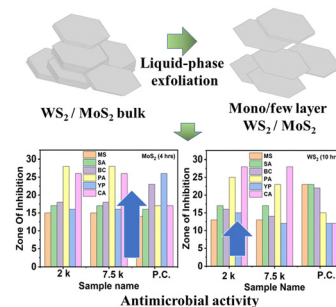


COMMUNICATION

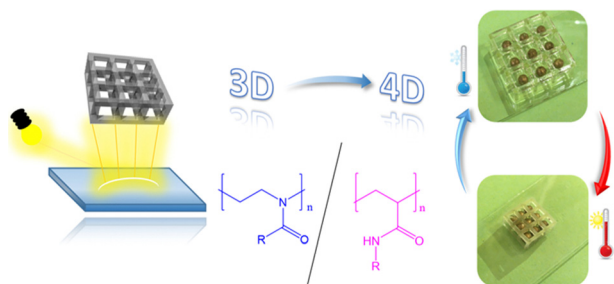
2736

Modulating mediation medium for few layered dichalcogenides enhances inhibition of common pathogens

Ashamoni Neog, Rajib Biswas,* Muzamil Ahmad Rather, Pritam Bardhan, Manabendra Mandal and Nirmal Mazumder*



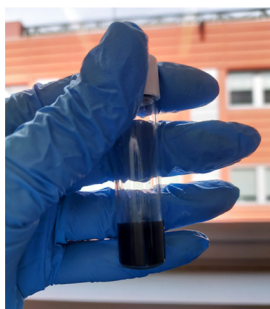
2750



4D printing of hydrogels based on poly(oxazoline) and poly(acrylamide) copolymers by stereolithography

Thomas Brossier, Michel Habib, Belkacem Tarek Benkhald, Gael Volpi, Vincent Lapinte* and Sebastien Blanquer*

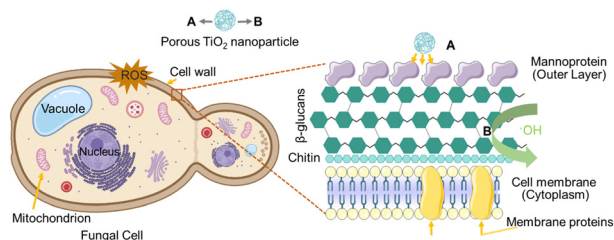
2759



NiGraf: a new nickel-based molecularly doped metal for enhanced water electrolysis

Mario Pagliaro,* Maria V. Pagliaro, Rocco Caliandro, Cinzia Giannini,* Rosaria Ciriminna* and Alessandro Lavacchi*

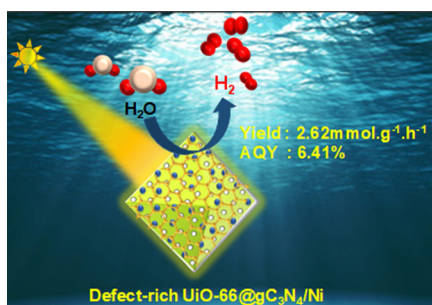
2767



Multifaceted properties of TiO₂ nanoparticles synthesized using *Mangifera indica* and *Azadirachta indica* plant extracts: antimicrobial, antioxidant, and non-linear optical activity investigation for sustainable agricultural applications

Archana Rana, Saurabh Pathak, Kapil Kumar, Anjali Kumari, Samridhi Chopra, Mahesh Kumar, Deeba Kamil, Ritu Srivastava, Sang-Koog Kim, Rajni Verma* and Shailesh Narain Sharma*

2785



Defect-rich UiO-66@g-C₃N₄/Ni frameworks as efficient water splitting photocatalysts

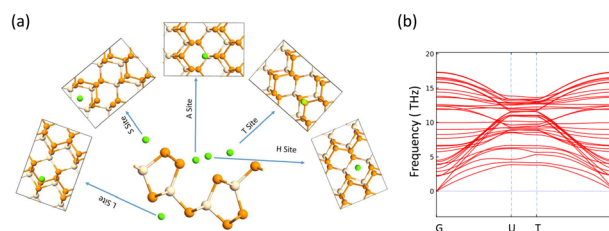
Aparna Jamma, Bhavya Jaksani, Chandra Shobha Vennapoosa, Spandana Gonuguntla, Saddam Sk, Mohsen Ahmadipour, Moses Abraham B., Indranil Mondal and Ujjwal Pal*



2797

Exploring pristine and transition metal doped SiP₂ monolayer as a promising anode material for metal (Li, Na, Mg) ion battery

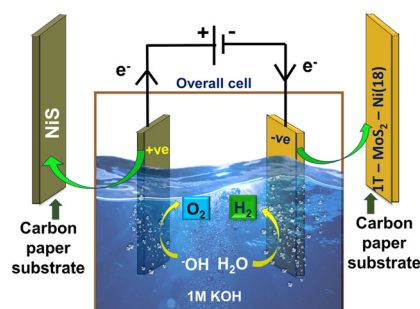
Shubham Sahoo, Puja Kumari and Soumya Jyoti Ray*



2805

Exploring the electrocatalytic prowess of a synergistic 1T-MoS₂-metallic Ni composite towards alkaline hydrogen evolution

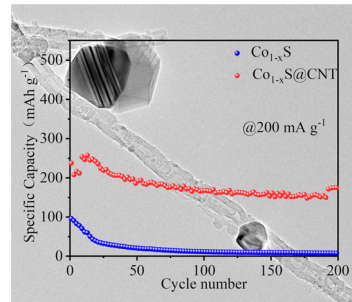
Avishek Roy, Ayan Mondal, Harish Reddy Inta, Sourav Ghosh, Khushboo S Paliwal, Soumalya Debnath, Ajith Ambattuparambil Valsan and Venkataramanan Mahalingam*



2818

Co_{1-x}S@CNT composite with a three-dimensional skeleton for high-performance magnesium–lithium hybrid batteries

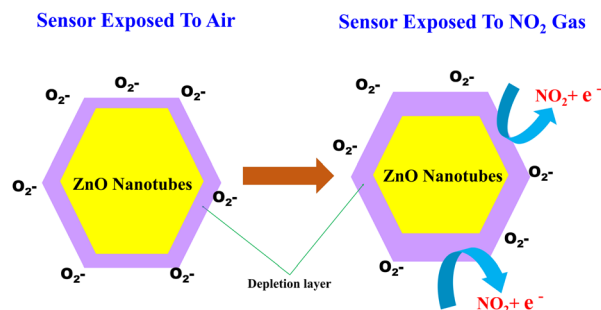
Changwei Shan, Wutao Wei,* Ximin Ling, Xuyan Qin, Zhao Liu, Mingjie Song and Liwei Mi*



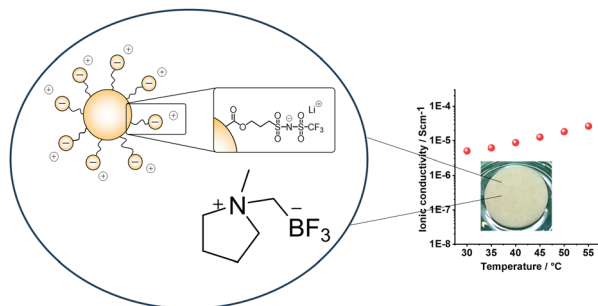
2826

Ultra-responsive and highly sensitive 1D ZnO nanotubes for detecting perilous low levels of NO₂ gas

Prasad R. Godse, Sujit A. Kadam,* Tanaji M. Nimbalkar, Yogesh M. Jadhav, Yuvraj B. Jadhao, Yuan-Ron Ma and Vikas B. Patil*



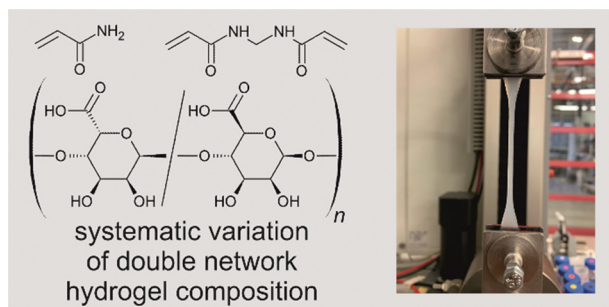
2841



Composite lithium conducting solid electrolytes based on zwitterionic plastic crystals and polymer nanoparticles

Faezeh Makhlooghiyad,* Luca Porcarelli, David Mecerreyes, Maria Forsyth, Luke A. O'Dell and Jennifer M. Pringle*

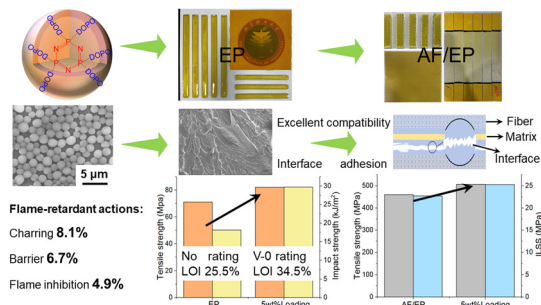
2851



Unravelling parameter interactions in calcium alginate/polyacrylamide double network hydrogels using a design of experiments approach for the optimization of mechanical properties

Oliver Gorke, Marc Stuhlmüller, Günter E. M. Tovar and Alexander Southan*

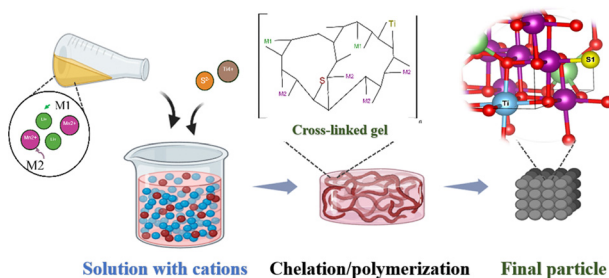
2860



Preparation of a cyclotriphosphazene microsphere bearing a phosphaphenanthrene structure towards fire-safety and mechanical enhancement for epoxy and its aramid fiber composite

Yunxian Yang,* Qi Zhang, Yiwen Hao, Xuke Lan, Laia Haurie, Dezhi Zheng and Guangyan Huang*

2872



Enhanced LiMn_2O_4 cathode performance in lithium-ion batteries through synergistic cation and anion substitution

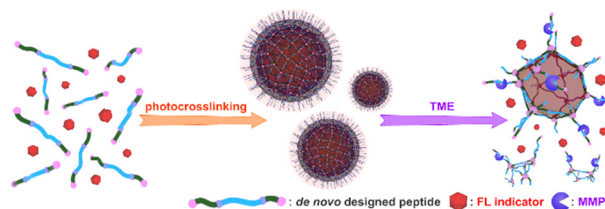
Oyunbayar Nyamaa, Hyo-Min Jeong, Gyeong-Ho Kang, Jung-Soo Kim, Kyeong-Mo Goo, In-Gyu Baek, Jeong-Hyeon Yang, Tae-Hyun Nam and Jung-Pil Noh*



2888

Photofabrication of fluorescent nanospheres from *de novo* designed peptides, and their enzyme-responsive dissociation in living cells

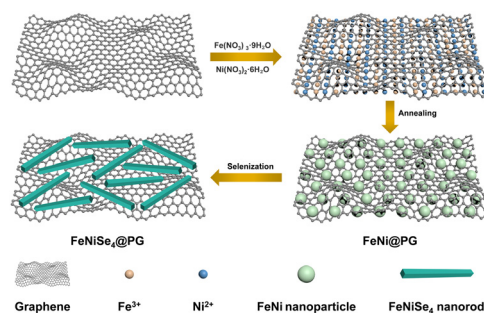
Sijie He, Xiang Shu, Zhaoyang Wang, Xue-Wang Gao, Ke Feng, Shumin Yang, Jianqun Shao and Nan Xie*



2898

Pliable electrode of porous graphene-encapsulated FeNiSe₄ binary-metal selenide nanorods as a binder-free anode for lithium-ion batteries

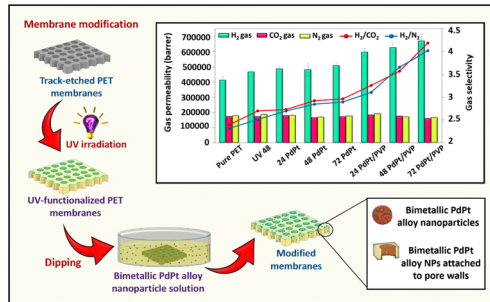
Mingming Hao, Caiyun Guo, Yuhui Wen, Liting Zhao, Xiaoting Zhang* and Rui Wang*



2906

Bimetallic PdPt alloy nanoparticle-decorated track-etched polyethylene terephthalate membranes for efficient H₂ separation

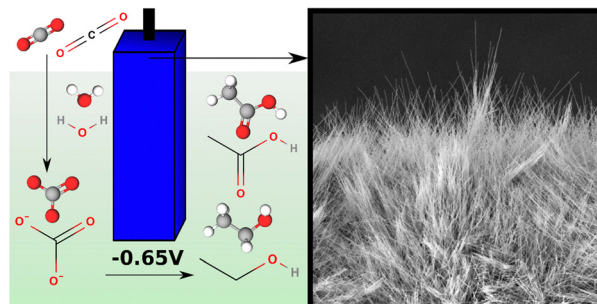
Nishel Saini, Sonalika Agarwal* and Kamleendra Awasthi*



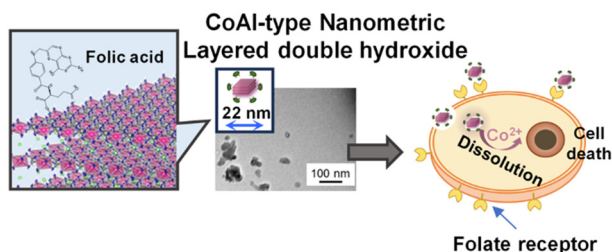
2917

A robust and high performance copper silicide catalyst for electrochemical CO₂ reduction

Vladislav Dřínek,* Pavel Dytrych, Radek Fajgar, Mariana Klementová, Jaroslav Kupčík, Jaromír Kopeček, Petr Svora, Martin Koštejn, Věra Jandová, Karel Soukup and Radim Beranek



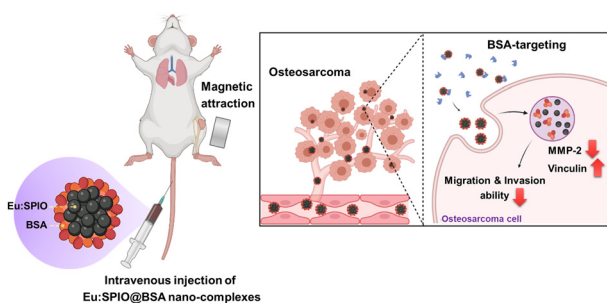
2926



Synthesis of 20-nm-sized CoAl-LDH nanoparticles modified with folic acid for enhanced cancer cell targeting

Yasuaki Tokudome,* Akiko Obata,* Nijika Kitagawa, Katsumi Nagatsuka, Eisuke Gorai, Yui Maehashi, Yojiro Kishida, Hidenobu Murata, Atsushi Nakahira and Toshihiro Kasuga

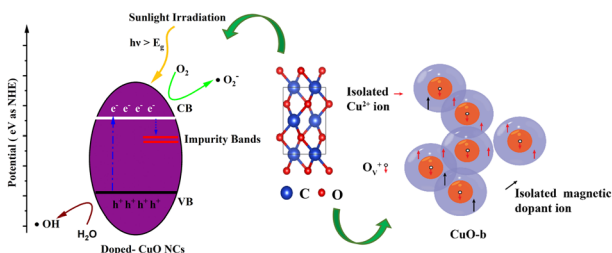
2934



Europium-doped hybrid nano-complexes: a potential strategy for metastasis prevention in osteosarcoma

Yu-Chi Wang, Fu-I Tung, Zheng-Ying Sung, Mei-Hsiu Chen, Ming-Hong Chen and Tse-Ying Liu*

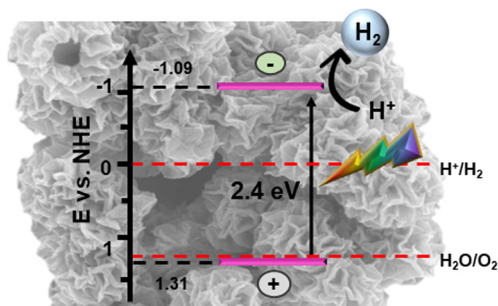
2946



Cationic and oxygen defect modulation for tailoring the bandgap and room temperature ferromagnetism of CuO via multiple d-block cations

Md Shafayatul Islam, Koushik Roy Chowdhury, Sheikh Manjura Hoque and Ahmed Sharif*

2968



Hierarchical nickel carbonate hydroxide nanostructures for photocatalytic hydrogen evolution from water splitting

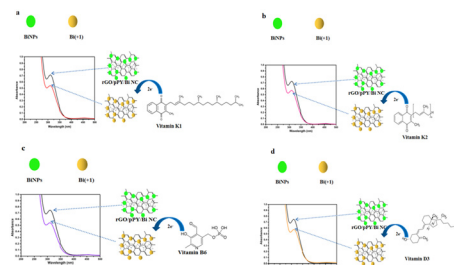
Parisa Talebi,* Rossella Greco,* Takashi Yamamoto, Mahdiyeh Zeynali, Saeid Asgharzadeh and Wei Cao



2974

Determination of vitamins K1, K2, B6, and D3 using reduced graphene oxide fabricated using a bismuth nanoparticle embedded polypyrrole nanocomposite based optical sensor

Zaib un Nisa Mughal, Huma Shaikh,*
Shahabuddin Memon and Sirajuddin

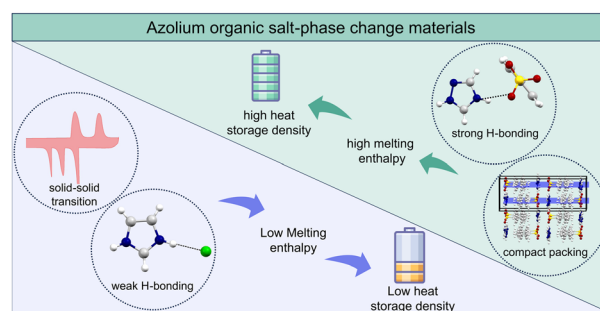


Interaction of (a) Vitamin K1 (b) Vitamin K2 (c) Vitamin B6 (d) Vitamin D3 with rGO/pPy/Bi NC in different mediums

2991

Investigation of the intermolecular origins of high and low heats of fusion in azolium salt phase change materials for thermal energy storage

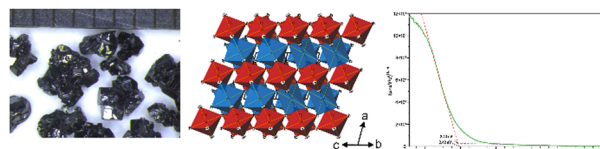
Saliha Saher, Samantha L. Piper, Craig M. Forsyth,
Mega Kar, Douglas R. MacFarlane,* Jennifer M. Pringle
and Karolina Matuszek*



3001

CoTeO₄ – a wide-bandgap material adopting the dirutile structure type

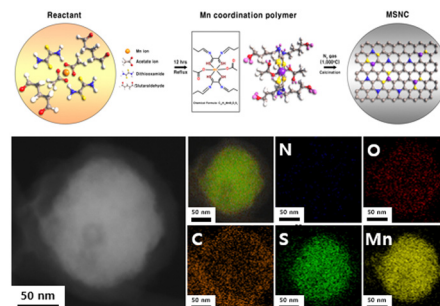
Matthias Weil,* Prativa Pramanik, Pierfrancesco Maltoni,
Rebecca Clulow, Andreas Rydh, Manfred Wildner,
Peter Blaha, Graham King, Sergey A. Ivanov,
Roland Mathieu and Harishchandra Singh



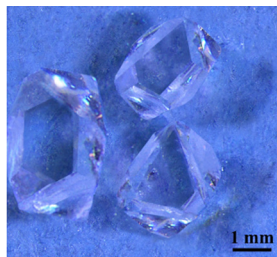
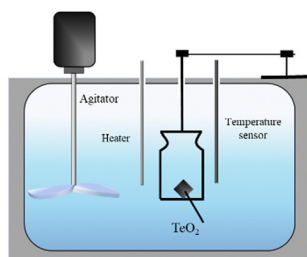
3014

A MnS/MnO-coated S,N-doped carbon anode obtained from a Mn(II)-coordinated polymer for long-cycle life Li-ion batteries

Kyubin Shim, Hyun Woo Kim, Sungwoo Park,
Kyeong-Deok Seo, Chang-Yeon Kim, Jin Bae Lee,
Jong Seong Bae and Hae Jin Kim*



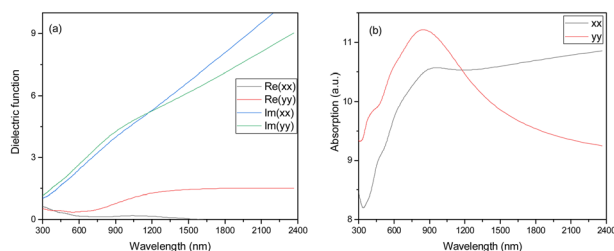
3022



Low-temperature aqueous solution growth of the acousto-optic TeO₂ single crystals

Lu Han, Chao Liu, Xiaoli Wang, Feiyu Li, Chuanyan Fan and Junjie Zhang*

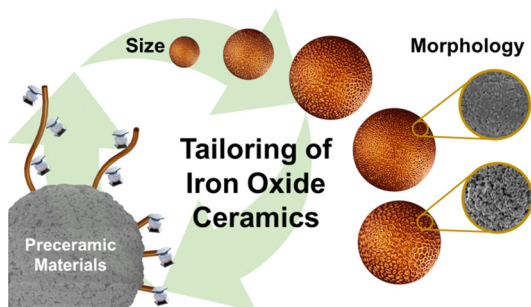
3029



Superior optical and thermoelectric properties of bilayer β_{12} -like phase borophene synthesized on Cu(111) film

Sajid Ali, Amin Ur Rahman and Mengtao Sun*

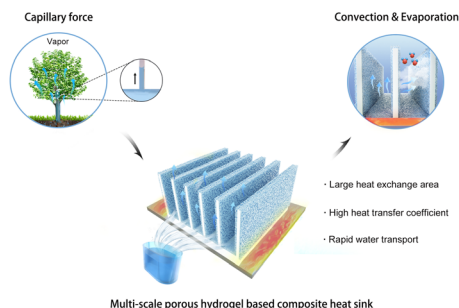
3037



Preparation of preceramic ferrocene-modified microparticles for the development of uniform porous iron oxide particles and their sustainable recycling

Deborah Schmitt, Oliver Janka, Regina Leiner, Guido Kickelbick and Markus Gallei*

3051



A high heat dissipation strategy based on a multi-scale porous hydrogel and heat sink exhibiting cooling capacity comparable to that of forced air convection but with zero energy consumption

Kaifen Yan, Weifeng Zhang,* Xue Feng, Weiyun Zhao, Lingling Wu and Yuan Deng*



3058

Synthesis, characterization, and magnetic and antibacterial properties of a novel iron(III) complex (CH₃)₂NH₂[Fe(phen)Cl₄]

Asmae Ben Abdelhadi, Sara Rodríguez-Sánchez, Rachid Ouarsal, Mohamed Saadi, Lahcen El Ammari, Nicola Morley, Brahim El Bali, Óscar Gómez-Torres, Mohammed Lachkar* and Abderrazzak Douhal*

