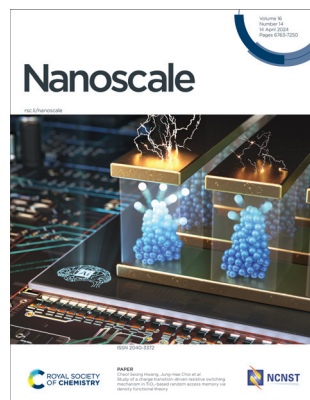


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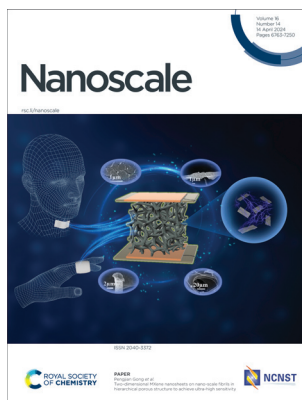
ISSN 2040-3372 CODEN NANOHL 16(14) 6763-7250 (2024)



### Cover

See Cheol Seong Hwang, Jung-Hae Choi *et al.*, pp. 6949–6960.

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### Inside cover

See Pengjian Gong *et al.*, pp. 6961–6972.

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## EDITORIAL

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### Celebrating the 150th anniversary of Vanderbilt University

De-en Jiang,\* Janet E. Macdonald\* and Sharon M. Weiss\*

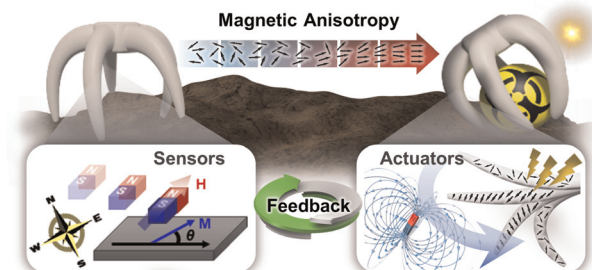


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### Anisotropy in magnetic materials for sensors and actuators in soft robotic systems

Hyeokju Kwon, Yeonhee Yang, Geonsu Kim, Dongyeong Gim and Minjeong Ha\*



# Environmental Science: Atmospheres

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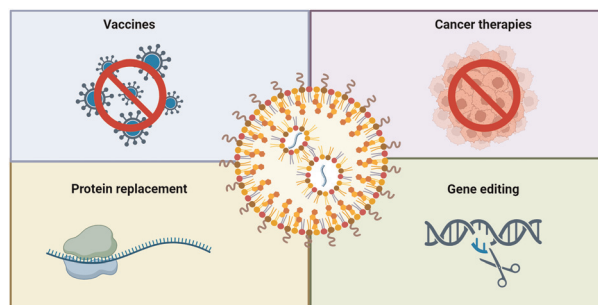
Fundamental questions  
Elemental answers





## Yeung Wu, Sinuo Yu and Irene de Lázaro\*

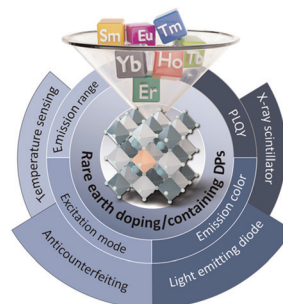
Yeung Wu, Sinuo Yu and Irene de Lázaro\*



6837

Haiyan Wang, Jiandong Yao and Ruosheng Zeng\*

Haiyan Wang, Jiandong Yao and Ruosheng Zeng\*



6853

Yanze Liu, Xiaobin Gao, Biao Zhao\* and Jianping Deng\*

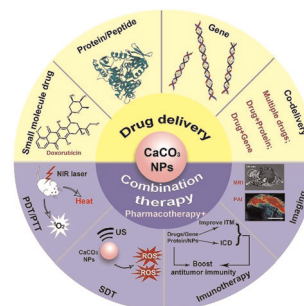
Yanze Liu, Xiaobin Gao, Biao Zhao\* and Jianping Deng\*



6876

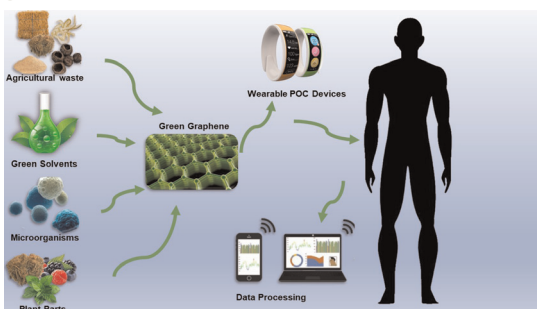
Xiaorong Yang, Yue Sun, Hong Zhang, Fengrui Liu,  
Qin Chen, Qiyang Shen, Zhe Kong, Qiaolin Wei,\*  
Jia-Wei Shen\* and Yong Guo\*

Xiaorong Yang, Yue Sun, Hong Zhang, Fengrui Liu,  
Qin Chen, Qiyang Shen, Zhe Kong, Qiaolin Wei,\*  
Jia-Wei Shen\* and Yong Guo\*



## REVIEWS

6900

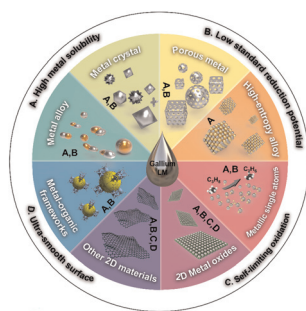


### Point-of-care devices engaging green graphene: an eco-conscious and sustainable paradigm

Joydip Sengupta and Chaudhery Mustansar Hussain\*

## MINIREVIEW

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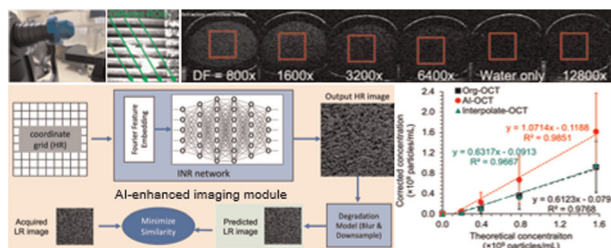


### Gallium-based liquid metals as reaction media for nanomaterials synthesis

Ming Wang and Yiliang Lin\*

## COMMUNICATIONS

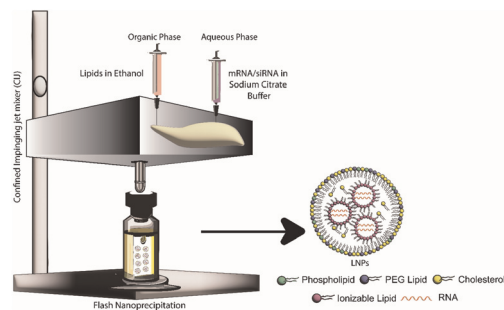
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### Quantifying particle concentration via AI-enhanced optical coherence tomography

Siqi Ye, Lei Xing, David Myung and Fang Chen\*

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### Flash nanoprecipitation assisted self-assembly of ionizable lipid nanoparticles for nucleic acid delivery

Bishal Misra, Krystal A. Hughes, William H. Pentz, Parinya Samart, Werner J. Geldenhuys and Sharan Bobbala\*

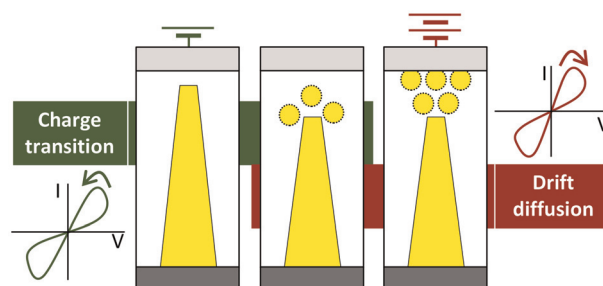


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# Study of a charge transition-driven resistive switching mechanism in $\text{TiO}_2$ -based random access memory via density functional theory

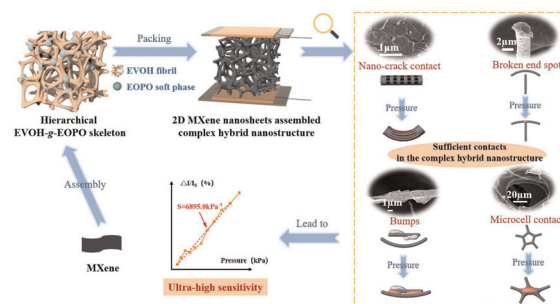
Taeyoung Jeong, In Won Yeu, Kun Hee Ye, Seungjae Yoon, Dohyun Kim, Cheol Seong Hwang\* and Jung-Hae Choi\*



6961

# Two-dimensional MXene nanosheets on nano-scale fibrils in hierarchical porous structure to achieve ultra-high sensitivity

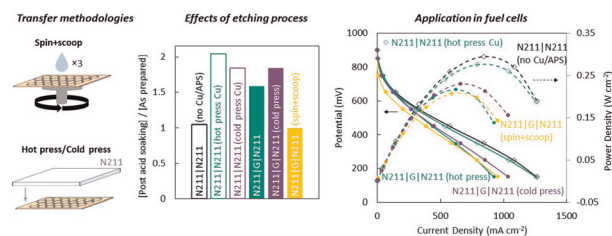
Bingjie Wu, Zhenghui Xie, Qiwu Shi, Junlong Yang, Chul B. Park, Pengjian Gong\* and Guangxian Li



6973

# Ultra-thin proton conducting carrier layers for scalable integration of atomically thin 2D materials with proton exchange polymers for next-generation PEMs

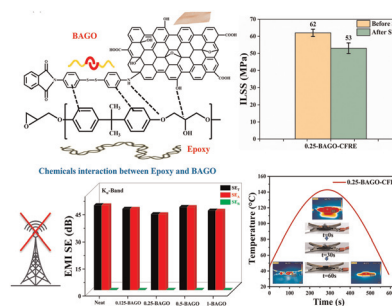
Nicole K. Moehring, Andrew E. Naclerio, Pavan Chaturvedi, Thomas Knight and Piran R. Kidambi\*



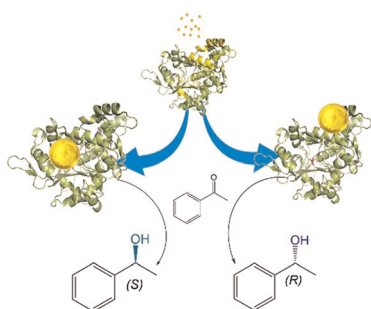
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# GO-tagged PEI sizing agent imparts self-healing and excellent mechanical properties to carbon fiber reinforced epoxy laminates

Samir Mandal, Ketaki Samanta,\* Kunal Manna, Subodh Kumar\* and Suryasarathi Bose\*



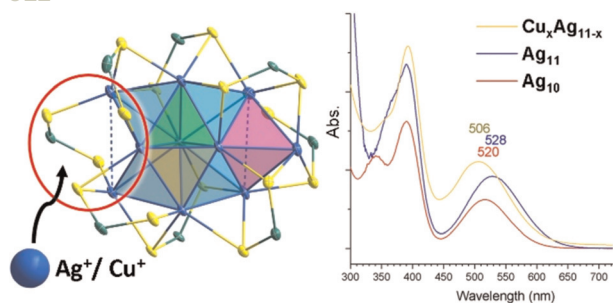
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### Design of a gold nanoparticles site in an engineered lipase: an artificial metalloenzyme with enantioselective reductase-like activity

Carla Garcia-Sanz, Blanca de las Rivas and Jose M. Palomo\*

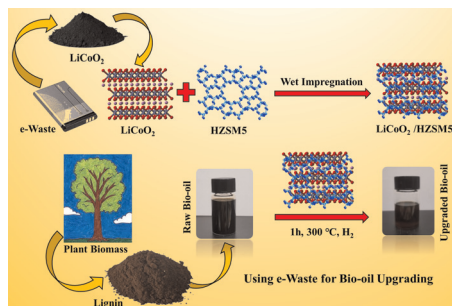
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### Doping effect on a two-electron silver nanocluster

Wei-Jung Yen, Jian-Hong Liao, Tzu-Hao Chiu, Jie-Ying Chen, Yuan Jang Chen, Samia Kahlal, Jean-Yves Saillard\* and C. W. Liu\*

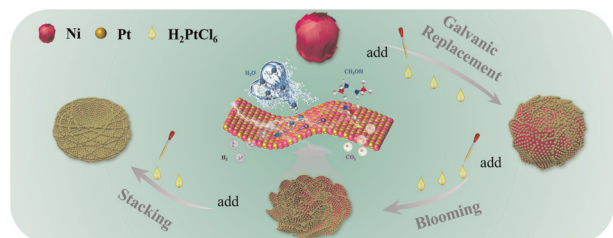
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### LiCoO<sub>2</sub> impregnated nano-hierarchical ZSM-5 assisted catalytic upgrading of Kraft lignin-derived liquefaction bio-oil

Ashutosh Agarwal\* and Xue Li\*

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### Galvanic replacement-induced preparation of bloom-like Pt<sub>23</sub>Ni<sub>77</sub> for methanol coupled efficient hydrogen production

Jin Zhao, Jinjin Wang, Ying Wang, Junming Zhang, Ergui Luo, Baoliang Lv, Tianjun Hu\* and Jianfeng Jia\*

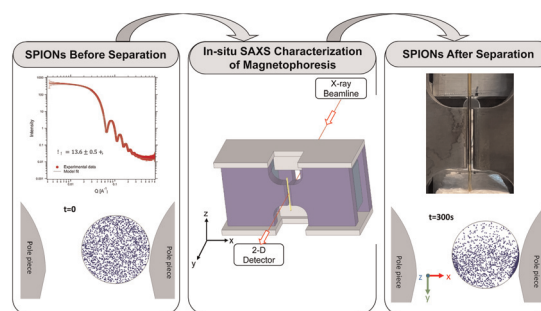


## PAPERS

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# Numerical modeling and *in situ* small angle X-ray scattering characterization of ultra-small SPION magnetophoresis in a high field and gradient separator

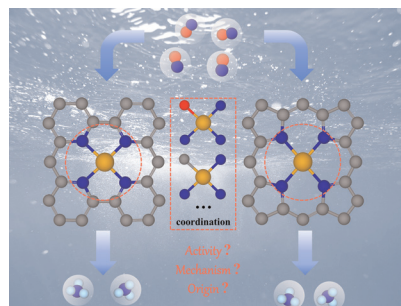
Xian Wu, Hyeon Choe, Jacob Strayer, Jenifer Gómez-Pastora, Maciej Zborowski, Barbara Wyslouzil and Jeffrey Chalmers\*



7058

# Graphene-based iron single-atom catalysts for electrocatalytic nitric oxide reduction: a first-principles study

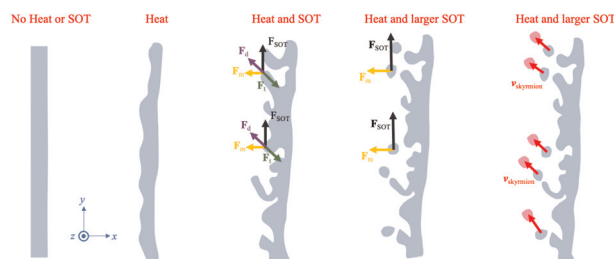
Haobo Li, Donghai Wu, Jiarui Wu, Wenjing Lv, Zhiyao Duan\* and Dongwei Ma\*



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# Generation of skyrmions by combining thermal and spin-orbit torque: breaking half skyrmions into skyrmions

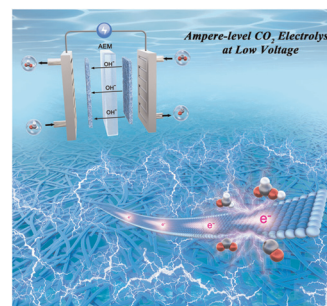
Sheng Yang, Laichuan Shen, Yuelel Zhao, Kai Wu, Xiaoguang Li, Ka Shen, Senfu Zhang, Xiaohong Xu, Johan Åkerman and Yan Zhou\*



7076

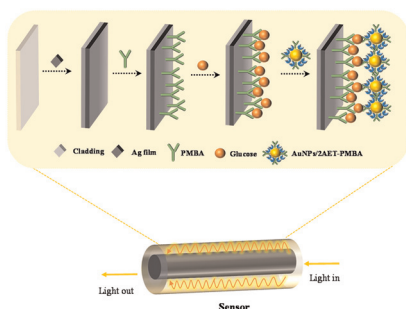
# Realizing ampere-level CO<sub>2</sub> electrolysis at low voltage over a woven network of few-atom-layer ultralong silverene nanobelts with ultrahigh aspect ratio by pairing with formaldehyde oxidation

Min Zhang, Xinyu Wang, Junjie Ding, Chaogang Ban, Yajie Feng, Chaohe Xu\* and Xiaoyuan Zhou\*





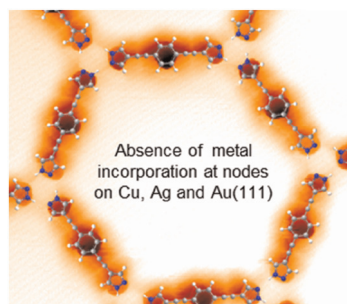
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### Silver-coated hollow fiber surface plasmon resonance sensor for glucose detection with enhanced limit of detection

Yangyang Xu, Xian Zhang, Xiao-Song Zhu\* and Yi-Wei Shi

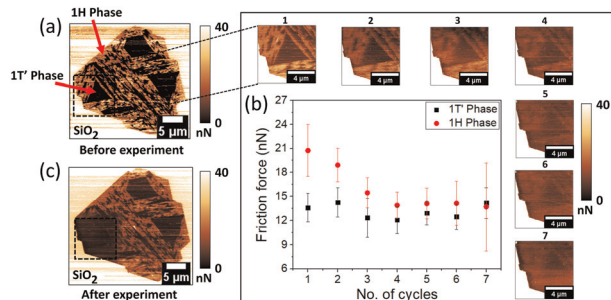
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### Discarding metal incorporation in pyrazole macrocycles and the role of the substrate on single-layer assemblies

Jorge Lobo-Checa,\* Sindy Julieth Rodríguez, Leyre Hernández-López, Lucía Herrero, Mario C. G. Passeggi, Jr., Pilar Cea and José Luis Serrano\*

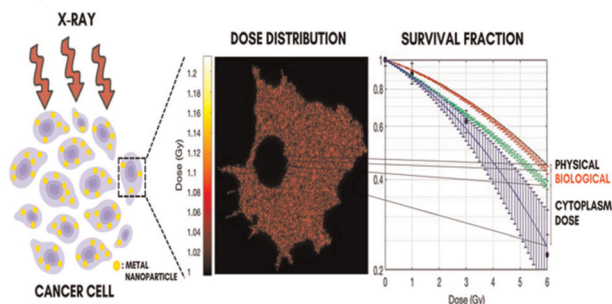
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### Transforming friction: unveiling sliding-induced phase transitions in CVD-grown WS<sub>2</sub> monolayers under single-asperity sliding nanocontacts

Himanshu Rai, Deepa Thakur, Aayush Gadgil, Zhijiang Ye,\* Viswanath Balakrishnan\* and Nitya Nand Gosvami\*

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### Clonogenic assay and computational modeling using real cell images to study physical enhancement and cellular sensitization induced by metal nanoparticles under MV and kV X-ray irradiation

Rodrigo Hernández Millares, Chaewon Bae, Seok-Jin Kim, Taewan Kim, So-Yeon Park, Kangwon Lee\* and Sung-Joon Ye\*



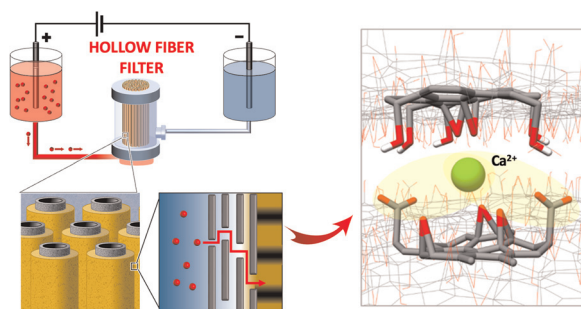


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### Selective ion transport in large-area graphene oxide membrane filters driven by the ionic radius and electrostatic interactions

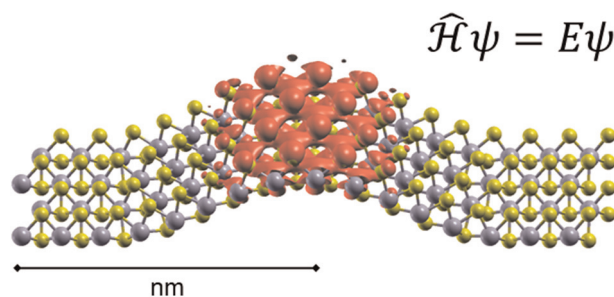
Lidia Lancellotti, Antonio Bianchi, Alessandro Kovtun, Massimo Gazzano, Tainah Dorina Marforio, Zhen Yuan Xia, Matteo Calvaresi, Manuela Melucci,\* Chiara Zanardi\* and Vincenzo Palermo\*



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### Electronic properties of MoSe<sub>2</sub> nanowrinkles

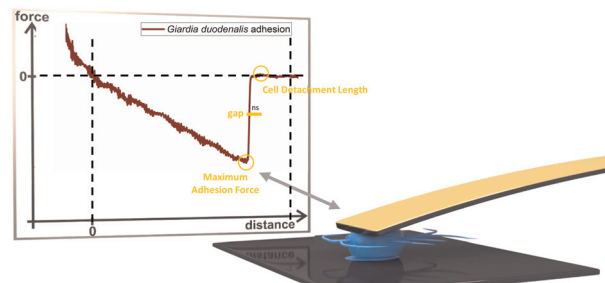
Stefan Velja,\* Jannis Krumland and Caterina Cocchi\*



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### Characterization of a unique attachment organelle: Single-cell force spectroscopy of *Giardia duodenalis* trophozoites

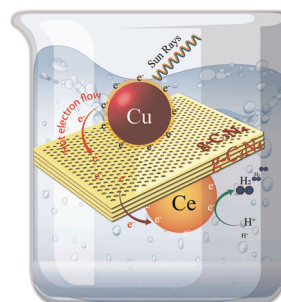
Gubesh Gunaratnam,\* Ricarda Leisering, Ben Wieland, Johanna Dudek, Nicolai Miosge, Sören L. Becker, Markus Bischoff, Scott C. Dawson, Matthias Hannig, Karin Jacobs, Christian Klotz, Toni Aebischer and Philipp Jung



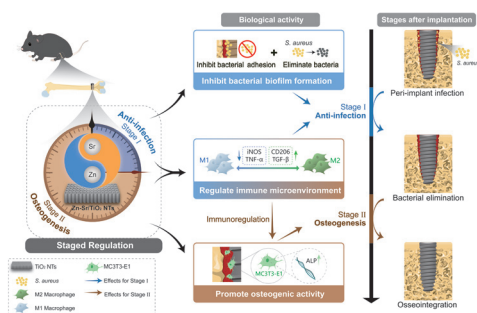
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### Proceeding of catalytic water splitting on Cu/Ce@g-C<sub>3</sub>N<sub>4</sub> photocatalysts: an exceptional approach for sunlight-driven hydrogen generation

Muhammad Zeeshan Abid, Aysha Tanveer, Khezina Rafiq,\* Abdul Rauf, Rongchao Jin and Ejaz Hussain\*



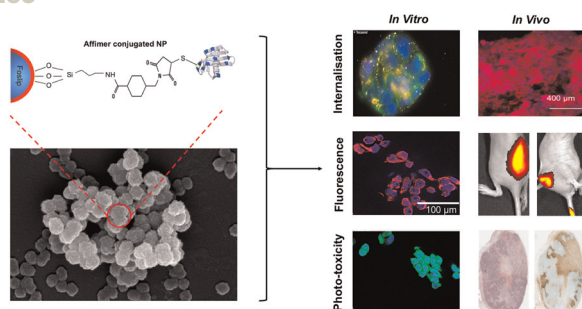
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## Ion-incorporated titanium implants for staged regulation of antibacterial activity and immunoregulation-mediated osteogenesis

Bingfeng Wu, Yufei Tang, Keyi Yao, Xin Luo, Shuqi Feng, Kai Wang, Xuemei Zhou\* and Lin Xiang\*

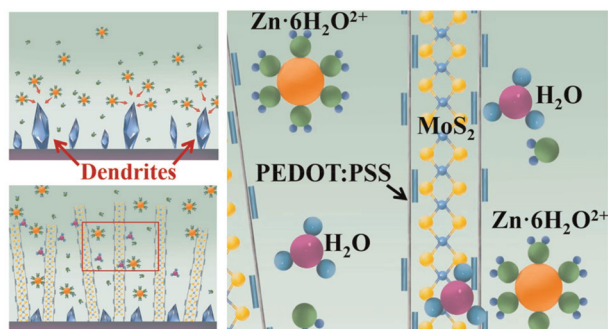
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## Photoactive imaging and therapy for colorectal cancer using a CEA-Affimer conjugated Foslip nanoparticle

Yazan S. Khaled,\* M. Ibrahim Khot, Radhika Aiyappa-Maudsley, Thomas Maisey, Arindam Pramanik, Jim Tiernan, Nicole Lintern, Eiman Al-Enezi, Shazana H. Shamsuddin, Darren Tomlinson, Louise Coletta, Paul A. Millner, Thomas A. Hughes\* and David G. Jayne\*

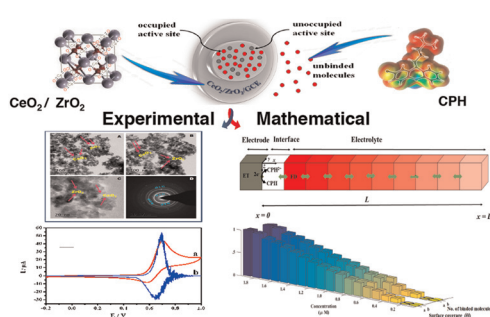
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## A dendrite-free Zn anode enabled by PEDOT:PSS/MoS<sub>2</sub> electrokinetic channels for aqueous Zn-ion batteries

Hai Wang, Qin Zhao, Weimin Li,\* Shun Watanabe\* and Xiaobo Wang\*

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## An innovative experimental and mathematical approach in electrochemical sensing for mapping a drug sensor landscape

Madheswaran Madhavan, Babu Shobana, Duraisamy Pandiaraja\* and Periakaruppan Prakash\*

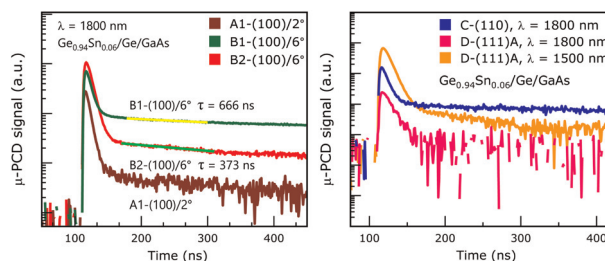


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### GeSn-on-GaAs with photoconductive carrier lifetime >400 ns: role of substrate orientation and atomistic simulation

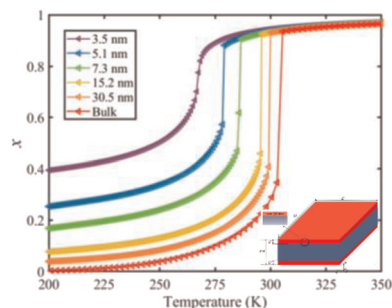
Sengunthar Karthikeyan, Steven W. Johnston, Dhammapriy Gayakwad, Suddhasatta Mahapatra, Robert J. Bodnar, Jing Zhao, Rutwik Joshi and Mantu K. Hudait\*



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### Effects of the surface energy and surface stress on the phase stability of spin crossover nano-objects: a thermodynamic approach

Shiteng Mi, Karl Ridier, Gábor Molnár, William Nicolazzi\* and Azzedine Bousseksou\*



## CORRECTION

7248

### Correction: Carbon dots on LAPONITE® hybrid nanocomposites: solid-state emission and inter-aggregate energy transfer

Bruno S. D. Onishi, Albano N. Carneiro Neto, Ricardo Bortoletto-Santos, Valmor. R. Mastelaro, Luís D. Carlos, Rute A. S. Ferreira\* and Sidney J. L. Ribeiro\*

