

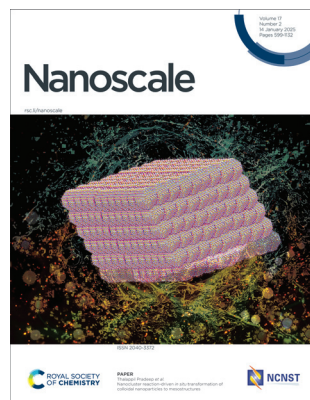
# Nanoscale

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## IN THIS ISSUE

ISSN 2040-3372 CODEN NANOHL 17(2) 599-1132 (2025)



### Cover

See Thalappil Pradeep *et al.*, pp. 803–812.

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## EDITORIAL

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### Festschrift issue of *Nanoscale* in honour of Santanu Bhattacharya

Asish Pal,\* Praveen Kumar Vemula and Shyni Varghese

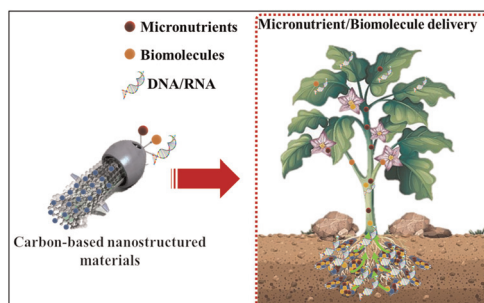


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### Carbon-based nanocarriers for plant growth promotion: fuelling when needed

Mohammad Ashfaq, Govind Gupta\* and Nishith Verma\*



# Environmental Science: Atmospheres

GOLD  
OPEN  
ACCESS

Connecting communities  
and inspiring new ideas

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Fundamental questions  
Elemental answers

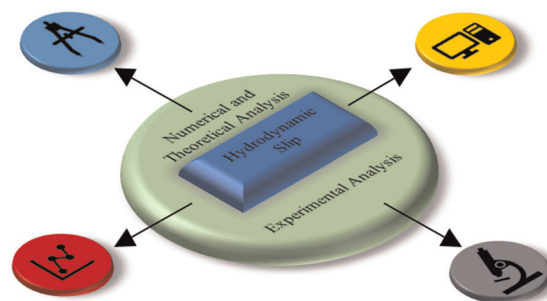


## REVIEWS

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**Hydrodynamic slip in nanoconfined flows: a review of experimental, computational, and theoretical progress**

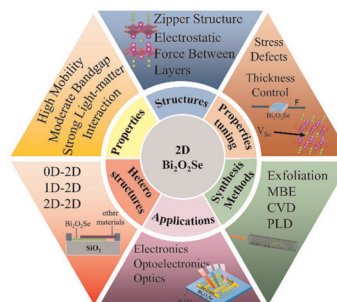
Abdul Aziz Shuvo, Luis E. Paniagua-Guerra, Juseok Choi, Seong H. Kim and Bladimir Ramos-Alvarado\*



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**Recent progress in two-dimensional  $\text{Bi}_2\text{O}_2\text{Se}$  and its heterostructures**

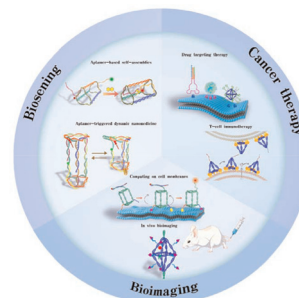
Xiaoyu Hu, Wen He,\* Dongbo Wang,\* Lei Chen, Xiangqian Fan, Duoduo Ling, Yanghao Bi, Wei Wu, Shuai Ren, Ping Rong, Yinze Zhang, Yajie Han and Jinzhong Wang\*



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**Aptamer-functionalized nucleic acid nanotechnology for biosensing, bioimaging and cancer therapy**

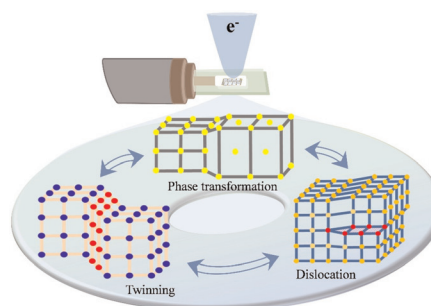
Xiaofang Zheng, Zhiyong Huang, Qiang Zhang, Guoli Li, Minghui Song and Ruizi Peng\*



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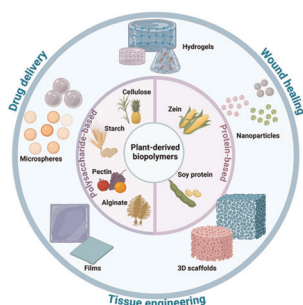
***In situ* transmission electron microscopy insights into nanoscale deformation mechanisms of body-centered cubic metals**

Hai Li, Ming Sheng, Kailin Luo, Min Liu, Qiuyang Tan, Sijing Chen,\* Li Zhong\* and Litao Sun



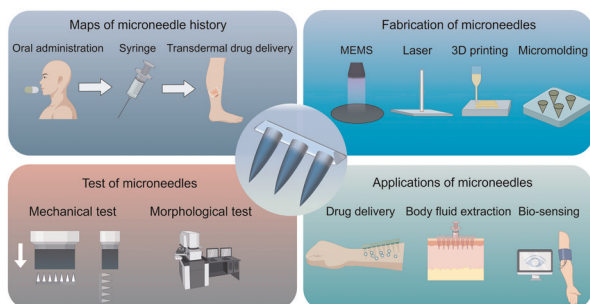
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**Plant-derived materials for biomedical applications**

Lele Li, Danni Zhong, Shoujie Wang\* and Min Zhou\*

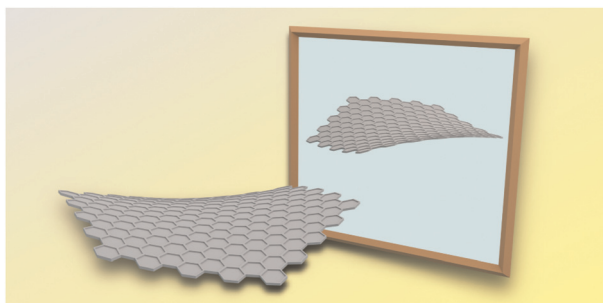
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**Microneedles: multifunctional devices for drug delivery, body fluid extraction, and bio-sensing**

Zhitao Wang, Siyu Tong, Jiaqi Niu, Cheng Cao, Ang Gao, Yingao Jiao, Yanfei Fu, Dongxia Li, Xinni Pan, Daxiang Cui, Nengquan Sheng, Li Yan, Shengsheng Cui,\* Shujing Lin\* and Yanlei Liu\*

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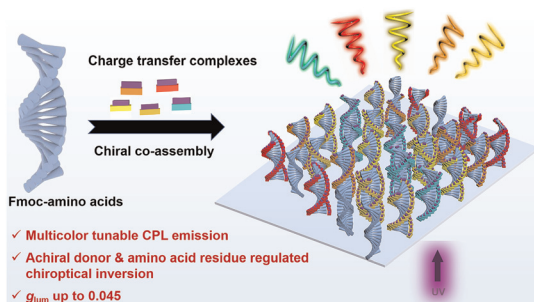
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**Chirality generation on carbon nanosheets by chemical modification**

Ryo Sekiya,\* Saki Arimura, Haruka Moriguchi and Takeharu Haino\*

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**Multicolor and sign-invertible circularly polarized luminescence from nonchiral charge-transfer complexes assembled with N-terminal aromatic amino acids**

Liyun Lai, Shunan Wang, Yunxiao Sang, Chen Feng, Min Liu, Fang Wang,\* Shaoliang Lin\* and Quan Zhou\*

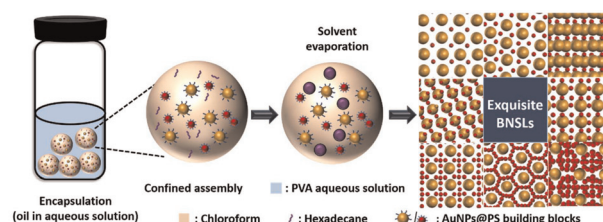


## COMMUNICATIONS

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### Effect of the number ratio and size ratio on the formation of binary superlattices assembled from polymer-tethered spherical nanoparticles of two sizes

Jinlan Li, Xin Yu, Jianing Zhang, Jing Jin,\* Yanxiong Pan,\* Xiangling Ji and Wei Jiang\*

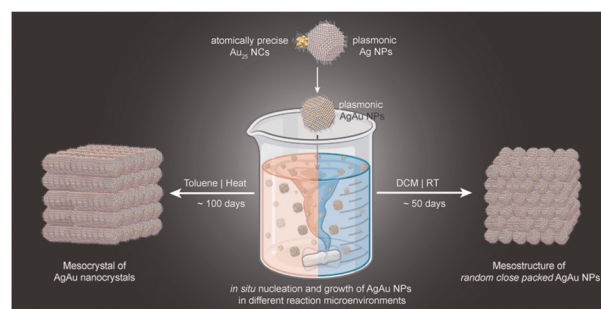


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### Nanocluster reaction-driven *in situ* transformation of colloidal nanoparticles to mesostructures

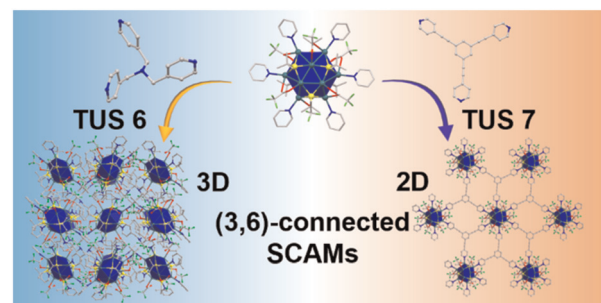
Paulami Bose, Pillalamarri Srikrishnarka, Matias Paatelainen, Nonappa, Amoghavarsha Ramachandra Kini, Anirban Som and Thalappil Pradeep\*



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### Designed construction of two new atom-precise three-dimensional and two-dimensional Ag<sub>12</sub> cluster-assembled materials

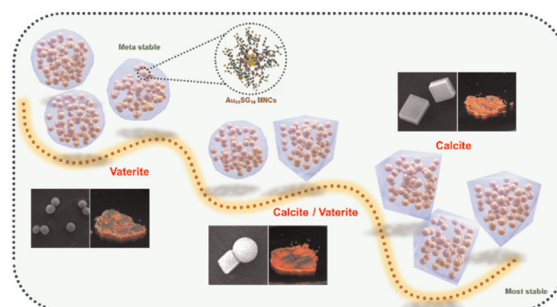
Riki Nakatani, Jin Sakai, Aishik Saha, Ayumu Kondo, Rina Tomioka, Tokuhisa Kawawaki, Saikat Das\* and Yuichi Negishi\*



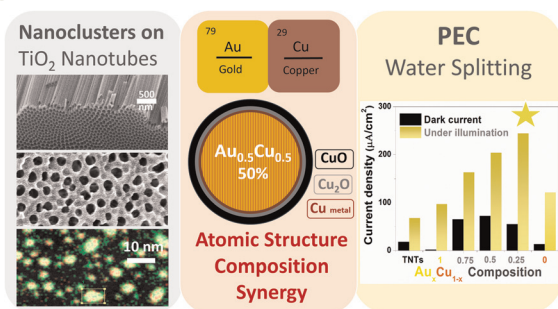
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### Tailoring the photoluminescence of AIE-type gold nanoclusters *via* biomineralization-inspired polymorphism

Sukhendu Mahata, Satya Ranjan Sahoo, Arun Mukhopadhyay, Komal Kumari, Surajit Rakshit and Nirmal Goswami\*



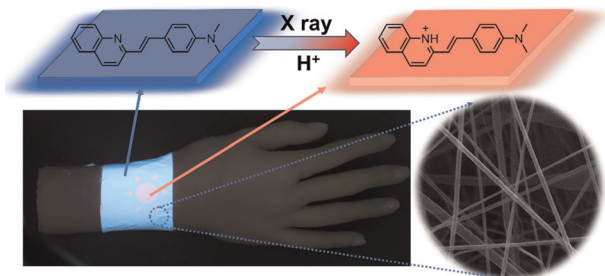
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### AuCu bimetallic nanocluster-modified titania nanotubes for photoelectrochemical water splitting: composition-dependent atomic arrangement and activity

Vana Chinnappa Chinnabathini, Karthick Raj Ag, Thi Hong Trang Nguyen, Zviadi Zarkua, Imran Abbas, Thi Hang Hoang, Peter Lievens, Didier Grandjean,\* Sammy W. Verbruggen\* and Ewald Janssens\*

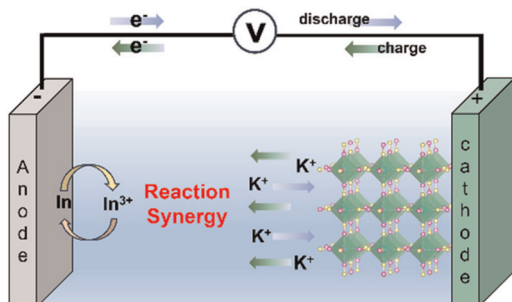
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### A flexible and energy independent fluorescence radiation fiber film dosimeter fabricated by electrostatic spinning

Mingshuo Tang, Zhiwei He, Zhihao Wang and Yunlong Wang\*

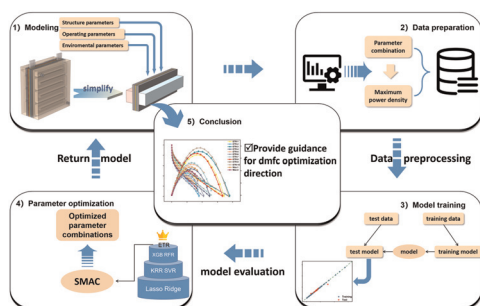
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### A high-efficiency and long-cycling aqueous indium metal battery enabled by synergistic $\text{In}^{3+}/\text{K}^{+}$ interactions

Songyang Chang, Wentao Hou, Amanda Conde-Delmoral, Irfan Ullah, Jose Fernando Florez Gomez, Gerardo Morell and Xianyong Wu\*

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### Electrode informatics accelerated the optimization of key catalyst layer parameters in direct methanol fuel cells

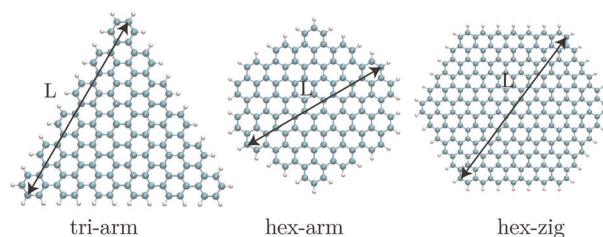
Lishou Ban, Danyang Huang, Yanyi Liu, Pengcheng Liu, Xihui Bian, Kaili Wang, Yifan Liu,\* Xijun Liu\* and Jia He\*



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### *Ab initio* calculations of vibrational fingerprints in the photoluminescence of graphene quantum dots

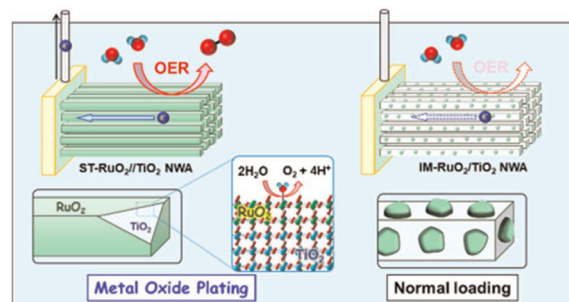
Ruoyu Wu, Peng Han,\* Tobias Dittmann, Fuhe Wang, Yan Zhang and Gabriel Bester\*



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### Metal oxide plating for maximizing the performance of ruthenium(IV) oxide-catalyzed electrochemical oxygen evolution reaction

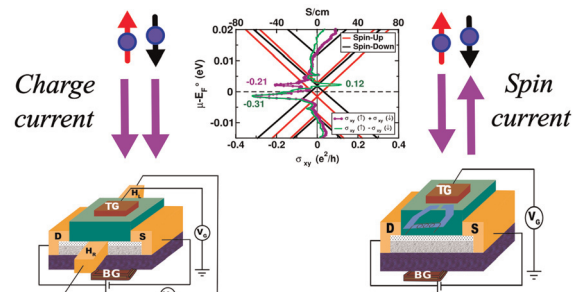
Shin-ichi Naya, Mio Nagamitsu, Hisashi Sugime, Tetsuro Soejima and Hiroaki Tada\*



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### Electrically and magnetically readable memory with a graphene/1T-CrTe<sub>2</sub> heterostructure: anomalous Hall transistor

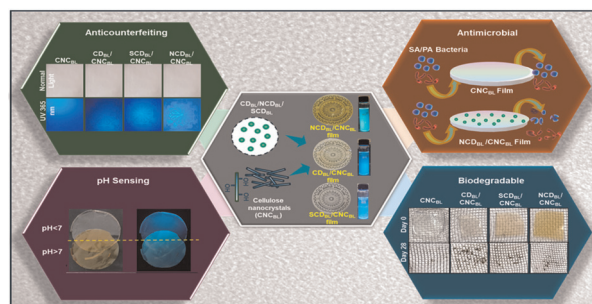
Surabhi Menon and Umesh V. Waghmare\*



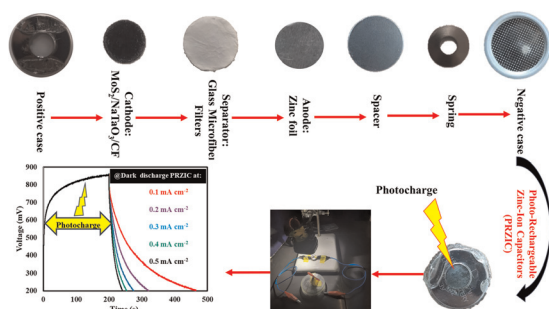
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### Biodegradable cellulose nanocrystal composites doped with carbon dots for packaging and anticounterfeiting applications

Shiva Singh, Keshav Dev, Shakshi Bhardwaj, Dakuri Ramakanth, Khushboo Rani Singh, Krishna Mohan Poluri, Kaushik Ghosh and Pradip K. Maji\*



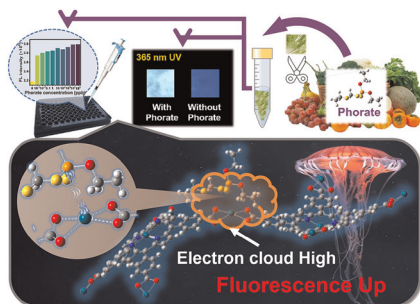
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### Photo-rechargeable zinc ion capacitors using $\text{MoS}_2/\text{NaTaO}_3/\text{CF}$ dual-acting electrodes prepared by photodeposition method

Aliakbar Mozafari, Mohamad Mohsen Momeni,\*  
Ali Naderi and Byeong-Kyu Lee\*

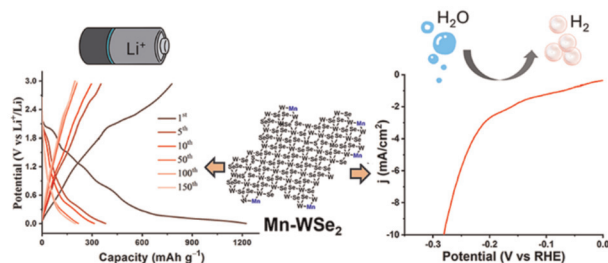
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### A bionic palladium metal–organic framework based on a fluorescence sensing enhancement mechanism for sensitive detection of phorate

Mengyao Li, Zhijie Wang, Hongyu Tang, Jingru Yang,  
Xianwei Luo, Youjia Tian, Mingxin Yang, Jinhong Jiang,  
Meng Wang, Lingna Zheng, Chenyan Ma,  
Gengmei Xing, Hongbin Wang\* and Juan Li\*

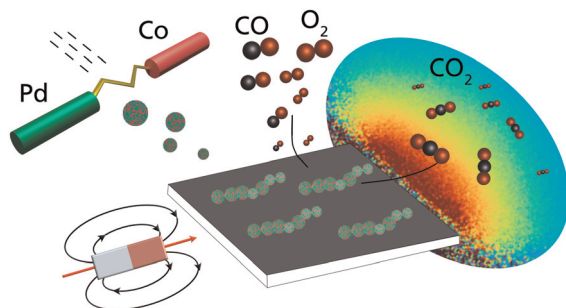
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### Mn-doped $\text{WSe}_2$ as an efficient electrocatalyst for hydrogen production and as anode material for lithium-ion batteries

Antonia Kagkoura,\* Shuangying Wei, Lunjie Zeng,  
Eva Olsson, Filipa M. Oliveira, Jan Luxa and  
Zdeněk Sofer\*

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### Magnetic field-assisted nanochain formation of intermixed catalytic Co–Pd nanoparticles

Calle Preger,\* Lisa Rämisch, Johan Zetterberg,  
Sara Blomberg and Maria E. Messing\*

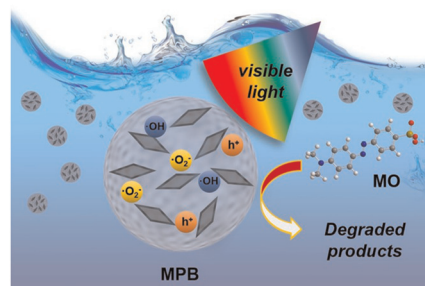


## PAPERS

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**Exfoliated MoS<sub>2</sub> nanosheets immobilized in porous microbeads as recoverable photocatalysts**

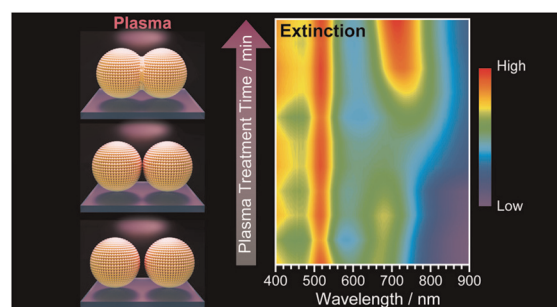
Daehwan Park, Jin Woong Kim and Chinedum O. Osuji\*



972

**Plasma-induced nanogap narrowing and morphological transformation in gold nanoparticle assemblies**

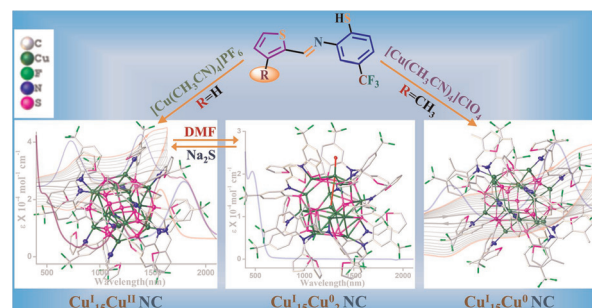
Jeongmin Han, Hoa Duc Trinh and Sangwoon Yoon\*



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**Analogous copper nanoclusters (Cu<sub>16/17</sub>) with two electron superatomic and mixed valence copper(II)/copper(I) and copper(I)/copper(0) characters**

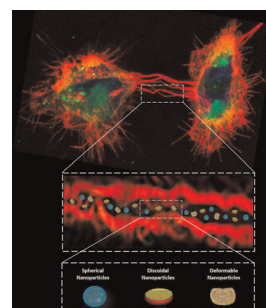
Shibaditya Kumar, Saikat Mishra, Aniruddha Das, Kuldeep Mahiya, Sourav Laha, Milan Maji and Apurba K. Patra\*



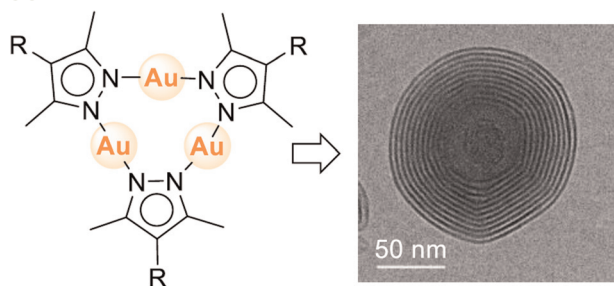
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**Nanoparticle shape is the game-changer for blood–brain barrier crossing and delivery through tunneling nanotubes among glioblastoma cells**

Giulia Sierri,\* Ines Saenz-de-Santa-Maria, Antonio Renda, Marcus Koch, Patrizia Sommi, Umberto Anselmi-Tamburini, Mario Mauri, Alessia D'Aloia, Michela Ceriani, Domenico Salerno, Francesco Mantegazza, Chiara Zurzolo and Francesca Re



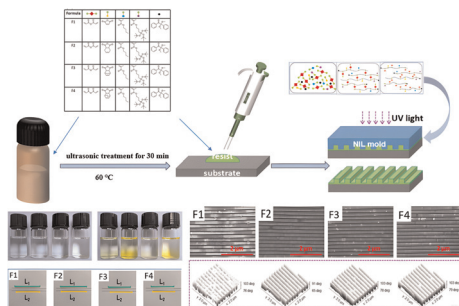
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### Nano ions based on an amphiphilic $\text{Au}_3(\text{pyrazolate})_3$ complex

Atena B. Solea, Davide Dermutas, Farzaneh Fadaei-Tirani, Luigi Leanza, Massimo Delle Piane, Giovanni M. Pavan and Kay Severin\*

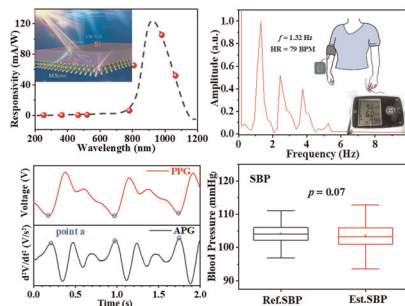
1013



### Low volume shrinkage, alkaline degradable UV nanoimprint lithography resists based on acrylic anhydride

Chuan-Zhe Zhao, Ya-Juan Cai, Yi-Xing Sun, Ya-Ge Wu, Ke-xiao Sang, Ting Yue, Zi-Hao Yang\* and Jing-Gang Gai\*

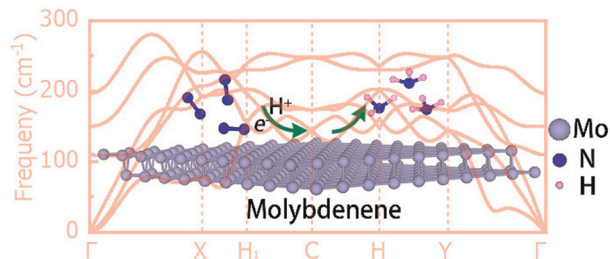
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### *In situ* fabrication of self-filtered near-infrared $\text{Ti}_3\text{C}_2\text{T}_x/\text{n-Si}$ Schottky-barrier photodiodes for a continuous non-invasive photoplethysmographic system

Chen Wang, Yu Xia, Wenli Duan, Yongqiang Yu,\* Qingyan Yang,\* Jiayong Jie, Xiujuan Zhang and Jiansheng Jie\*

1031



### Novel two-dimensional molybdenene as a promising electrocatalyst for the nitrogen reduction reaction: a first-principles prediction

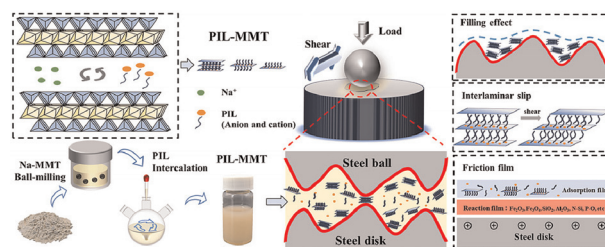
Song Yu, Huajian Pan, Xinzhuo Zhou, Xuepeng Xu, Dongxiao Yang and Gang Bi\*



1039

## Ionic liquid functionalized binary montmorillonite nanomaterials as water-based lubricant additives for steel/steel contact

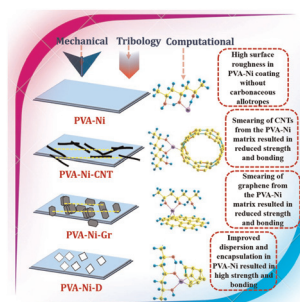
Xiaoxiao Du, Zekun Kang and Xia Zhang\*



1053

## Particle surface engineering at the nano-micro scale interfaces of metal-nonmetal bonded polymeric coatings: experimental and *in silico* evaluations

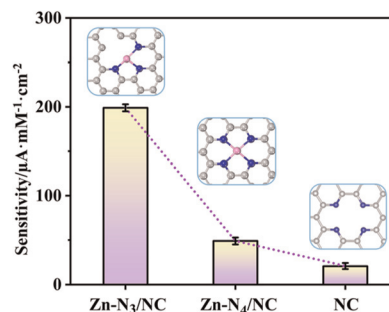
Suman Yadav, Sarvesh Kumar Pandey\* and Shikha Awasthi\*



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## Regulation of the coordination number of Zn single atoms to boost electrochemical sensing of H<sub>2</sub>O<sub>2</sub>

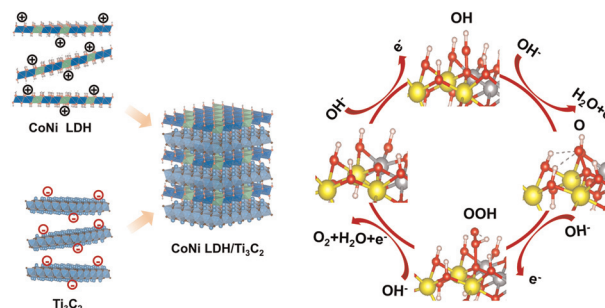
Ziyin Yang,\* Yaqi Kong and Chengcheng Qi\*



1080

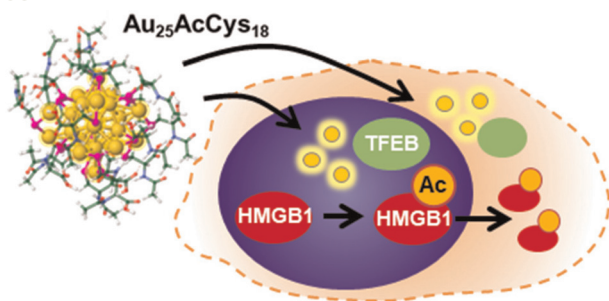
## Tunable heteroassembly of 2D CoNi LDH and Ti<sub>3</sub>C<sub>2</sub> nanosheets with enhanced electrocatalytic activity for oxygen evolution

Xueyi Lu, Lulu Jia, Minchen Hou, Xuemin Wu, Chang Ni, Gaofei Xiao,\* Renzhi Ma\* and Xia Lu\*



## PAPERS

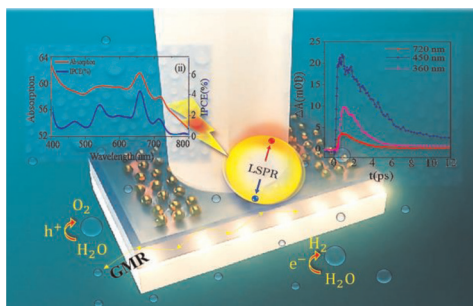
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### Gold nanoclusters $\text{Au}_{25}\text{AcCys}_{18}$ normalize intracellular ROS without increasing cytoplasmic alarmin acHMGB1 abundance in human microglia and neurons

Issan Zhang, Dusica Maysinger,\* Maja Beus, Antonija Mravak, Ziqi Yu, Martina Perić Bakulić, Patrick A. Dion, Guy A. Rouleau, Vlasta Bonačić-Koutecký, Rodolphe Antoine and Željka Sanader Maršić\*

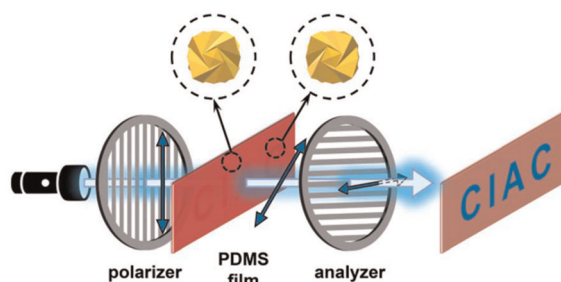
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### Engineering plasmonic charge kinetics and broadband photoelectrochemical spectral responses using a multi-resonant $\text{Au-TiO}_2$ plasmonic particle grating-based optical resonator

Saurabh Pandey, Shereena Joseph, Shubhangi Majumdar, Jagriti Ahuja, Shital Devinder, Shumile Ahmed Siddiqui, Kaushik Ghosh and Joby Joseph\*

1119



### Patternable chiral Au nanocrystal-doped composite films for information encryption: the role of optical rotation

Yu Tian, Xiaoxi Luan, Xiali Lv, Fengxia Wu, Guobao Xu and Wenxin Niu\*

## CORRECTION

1129

### Correction: Broadening spectral responses and achieving environmental stability in $\text{SnS}_2/\text{Ag-NPs}/\text{HfO}_2$ flexible phototransistors

Muhammad Farooq Khan, Sana Sadaqat, Muhammad Asghar Khan, Shania Rehman, Waqas Siddique Subhani, Mohamed Ouladsmame, Malik Abdul Rehman, Fida Ali, Harri Lipsanen, Zhipei Sun, Jonghwa Eom\* and Faisal Ahmed\*

