

# Nanoscale Advances

An open access journal publishing across the breadth of nanoscience and nanotechnology  
[rsc.li/nanoscale-advances](https://rsc.li/nanoscale-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 2516-0230 CODEN NAADAI 6(22) 5467–5738 (2024)



### Cover

See Naoki Tomioka, Yu Matsuda *et al.*, pp. 5579–5584. Image reproduced by permission of Yu Matsuda from *Nanoscale Adv.*, 2024, 6, 5579.



### Inside cover

See Tae Geol Lee, Min Beom Heo, Jin Gyeong Son *et al.*, pp. 5585–5597. Image reproduced by permission of Jin Gyeong Son from *Nanoscale Adv.*, 2024, 6, 5585.

## EDITORIAL

5476

### Supramolecular chirality in self-organised systems and thin films

G. Giancane, S. Bettini and L. Valli

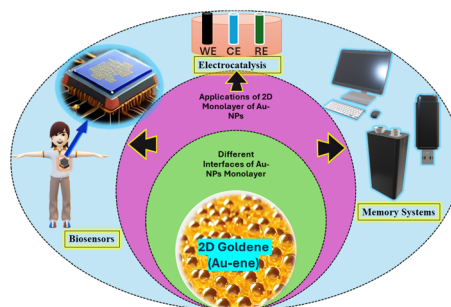


## REVIEWS

5478

### Gold on the horizon: unveiling the chemistry, applications and future prospects of 2D monolayers of gold nanoparticles (Au-NPs)

Tholkappiyan Ramachandran,<sup>\*</sup> Ashraf Ali, Haider Butt, Lianxi Zheng, Firdous Ahmad Deader and Moh'd Rezeq<sup>\*</sup>



# 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



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



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



**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](https://rsc.li/rsc-advances)

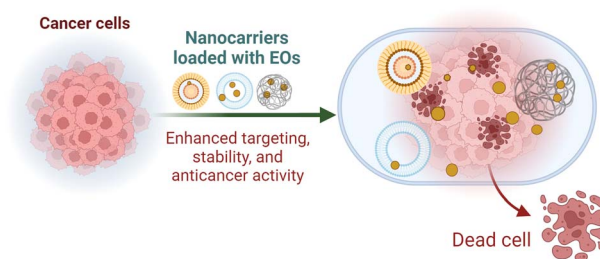
[@RSC\\_Adv](#)

## REVIEWS

5511

**Beyond aromatherapy: can essential oil loaded nanocarriers revolutionize cancer treatment?**

Obaydah Abd Alkader Alabrahim, Jude Majed Lababidi, Wolfgang Fritzsche and Hassan Mohamed El-Said Azzazy\*

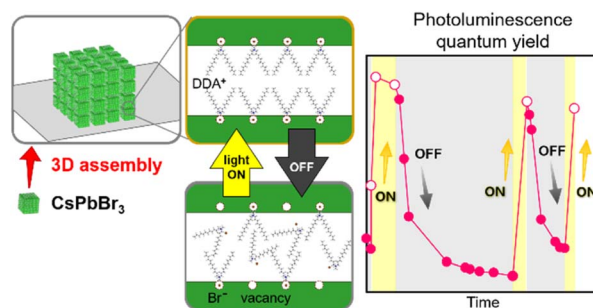


## COMMUNICATIONS

5563

**Assembly-promoted repeatable enhancement of photoluminescence from cesium lead tribromide nanocubes under light illumination**

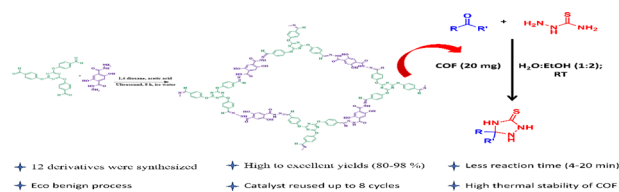
Shota Hashimoto, Hiroto Watanabe, Yoshiki Iso, Yuya Oaki, Tetsuhiko Isobe and Hiroaki Imai\*



5568

**Unveiling the catalytic potency of a novel hydrazone-linked covalent organic framework for the highly efficient one-pot synthesis of 1,2,4-triazolidine-3-thiones**

Pankaj Teli, Shivani Soni, Sunita Teli and Shikha Agarwal\*

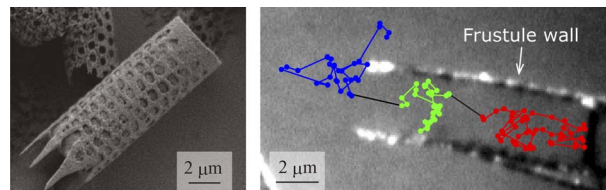


## PAPERS

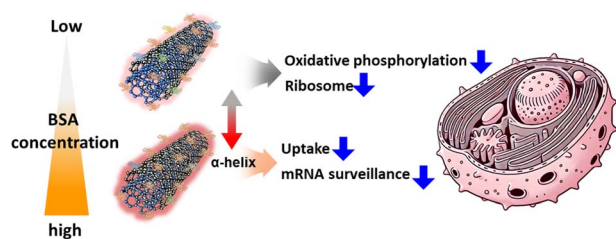
5579

**Diffusion of individual nanoparticles in cylindrical diatom frustule**

Naoki Tomioka,\* Yusaku Abe and Yu Matsuda\*



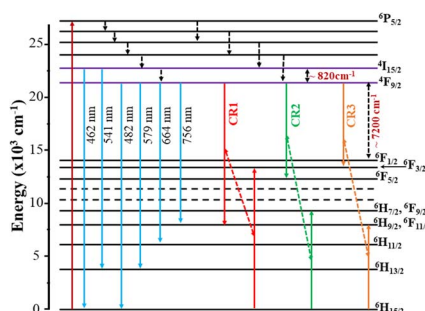
5585



### Influence of albumin concentration on surface characteristics and cellular responses in the pre-incubation of multi-walled carbon nanotubes

Sun Young Lee, Jae Won Choi, Tae Geol Lee,\*  
Min Beom Heo\* and Jin Gyeong Son\*

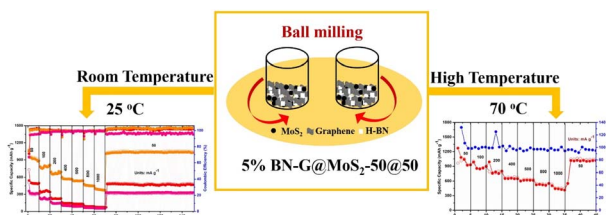
5598



### Optical properties and Judd–Ofelt analysis of Dy<sup>3+</sup> doped CoAl<sub>2</sub>O<sub>4</sub> nanocrystals

N. T. Hien, N. T. Kien, V. H. Yen, T. Ngoc, P. V. Do,  
V. X. Phuc and N. X. Ca\*

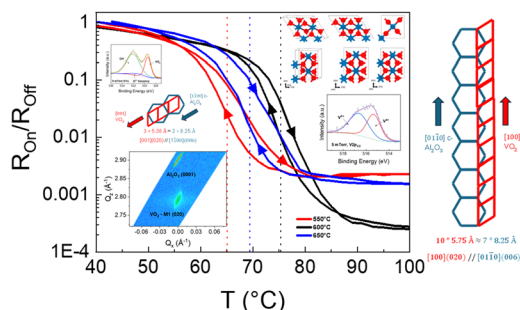
5612



### A 2D hybrid nanocomposite: a promising anode material for lithium-ion batteries at high temperature

Bongu Chandra Sekhar, Abdelrahman Soliman,  
Muhammad Arsalan and Edreese H. Alsharaeh\*

5625



### Tunable insulator–metal transition in epitaxial VO<sub>2</sub> thin films via strain and defect engineering

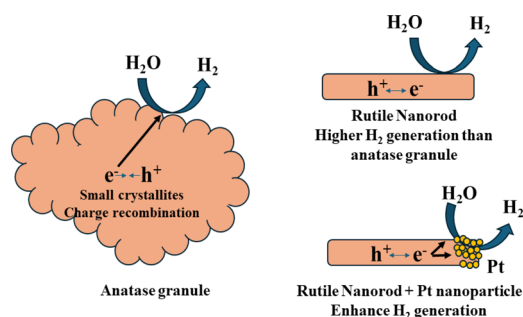
Aditya Kamat, Gurukrishna K., Rishow Kumar,  
Abhishek Mishra, Amit Kumar Verma, Shivam Tripathi,  
Ashish Garg and Shikhar Misra\*



5636

### Impact of polymorphism vs. shape of titania nanocrystals on the hydrogen evolution reaction

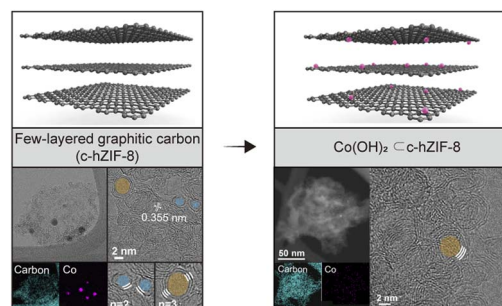
Ankur Yadav, Vivek Kumar Agrahari, Yuriy Pihosh, Mamiko Nakabayashi, Wojciech Nogala, Balendu Sekhar Giri, Kazunari Domen, Daya Shankar Pandey,\* Bhavana Gupta\* and Subha Sadhu\*



5646

### Designing few-layered graphitic carbons with atomic-sized cobalt hydroxide by harnessing hollow metal–organic frameworks

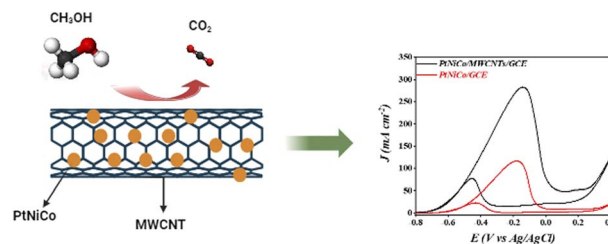
Eun Jin Cho, Bo-Min Kim, WooYeon Moon, Dong Gyu Park, Young-Wan Ju, Won Ho Choi\* and Jeeyoung Shin\*



5654

### Environmentally friendly PtNiCo nanocatalysts enhanced with multi-walled carbon nanotubes for sustainable methanol oxidation in an alkaline medium

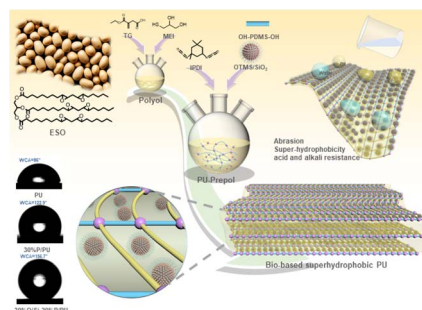
Merve Akin, Anas El Attar, Ramazan Bayat, Muhammed Bekmezci, Badr Bouljoihel, Mama El Rhazi and Fatih Sen\*



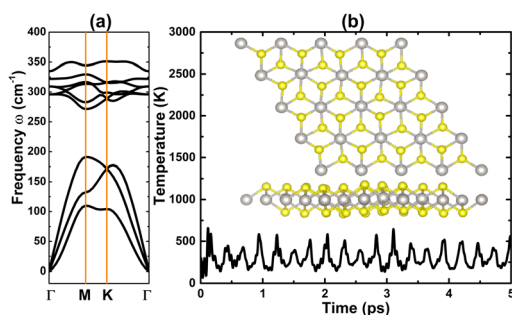
5663

### A highly reactive soybean oil-based superhydrophobic polyurethane film with long-lasting antifouling and abrasion resistance

Junming Huang, Genzheng Sha, Minghui Cui, Mengqiu Quan, Yuqing Wang, Yao Lu,\* Jin Zhu and Jing Chen\*



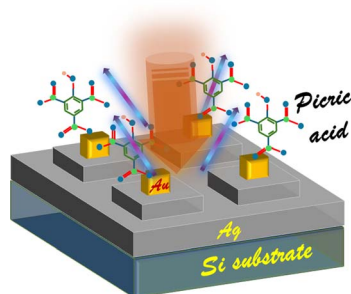
5671



### A systematic study of $\text{TMO}_n$ ( $\text{TM} = \text{V}, \text{Cr}, \text{Mn}$ , and $\text{Fe}$ ; $n = 3$ and $6$ ) clusters embedded in a $\text{PtS}_2$ monolayer

Nguyen Thanh Tien, J. Guerrero-Sanchez and D. M. Hoat\*

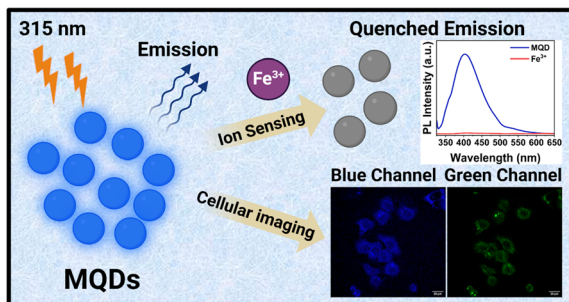
5681



### 3D nanoplasmonic structure for ultrahigh enhanced SERS with less variability, polarization independence, and multimodal sensing applied to picric acid detection

Anand M. Shrivastav, Mohammad Abutoama and Ibrahim Abdulhalim\*

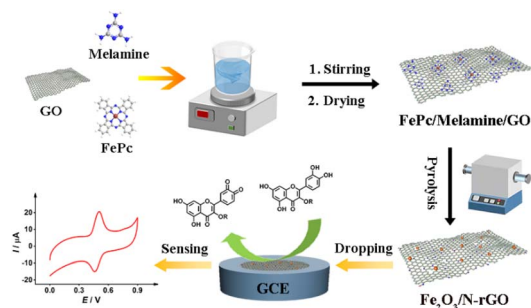
5694



### L-cysteine capped $\text{MoS}_2$ QDs for dual-channel imaging and superior $\text{Fe}^{3+}$ ion sensing in biological systems

Vishakha Takhar, Simranjit Singh, Superb K. Misra and Rupak Banerjee\*

5708



### A catalytic amplification platform based on $\text{Fe}_2\text{O}_3$ nanoparticles decorated graphene nanocomposites for highly sensitive detection of rutin

Zhuzhen Chen, Tingting Zhang, Xue Zhang, Wangxing Cheng,\* Linwei Chen\* and Nannan Lu\*

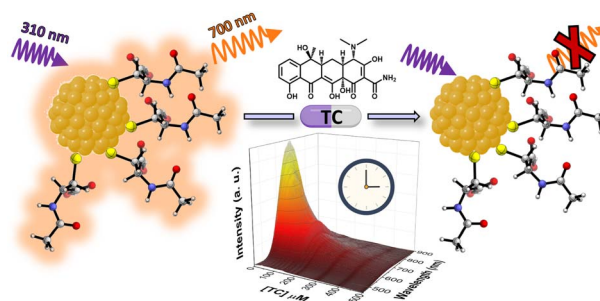


## PAPERS

5718

## Harnessing sustainable nanoclusters for sensitive optical detection of tetracyclines and the underlying mechanism

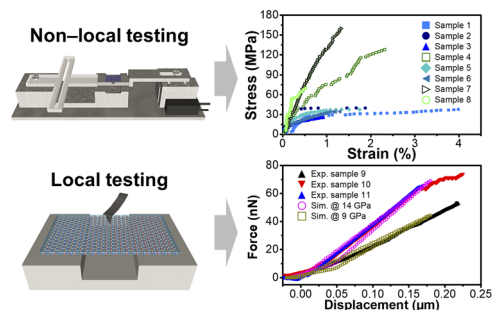
Miguel Justo-Tirado, Irene Pérez-Herráez, Jorge Escorihuela, Raúl Arenal, Elena Zaballos-García\* and Julia Pérez-Prieto\*



5727

## Mechanical properties of freestanding few-layer graphene/boron nitride/polymer heterostacks investigated with local and non-local techniques

Marcus Lespasio, Elena Missale, Bashar Aziz, Yoosuk Kim, Giorgio Speranza, Ralu Divan, David J. Gosztola, Chi-Hou Lei, Maria F. Pantano\* and Irma Kuljanishvili\*



## RETRACTIONS

5735

## Retraction: Sequestration of chromium(vi) and nickel(II) heavy metals from unhygienic water via sustainable and innovative magnetic nanotechnology

Noor Zulfiqar,\* Monireh Shariatipour and Fawad Inam

5736

## Retraction: Photo-responsive hole formation in the monolayer membrane wall of a supramolecular nanotube for quick recovery of encapsulated protein

N. Kameta,\* Y. Kikkawa and Y. Norikane

