

Materials Advances

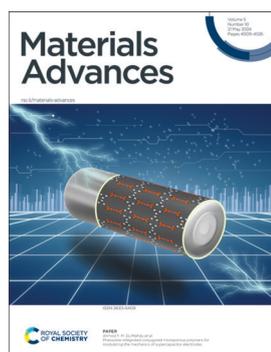
An open access journal publishing across the breadth of materials science

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.

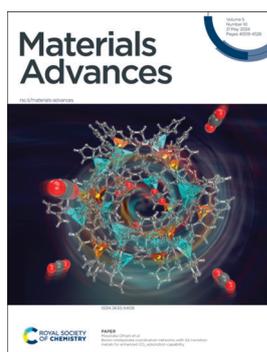
IN THIS ISSUE

ISSN 2633-5409 CODEN MAADC9 5(10) 4009-4526 (2024)



Cover

See Ahmed F. M. EL-Mahdy *et al.*, pp. 4142–4150.
Image reproduced by permission of Ahmed F. M. EL-Mahdy from *Mater. Adv.*, 2024, 5, 4142.



Inside cover

See Masataka Ohtani *et al.*, pp. 4151–4158.
Image reproduced by permission of Masataka Ohtani from *Mater. Adv.*, 2024, 5, 4151.

EDITORIAL

4023

Introduction to surface engineering of transition metal-based 2D layered materials for anti-corrosion and energy applications

Subrata Kundu

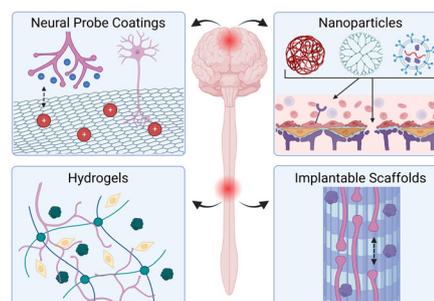


REVIEWS

4025

Biomaterial strategies for regulating the neuroinflammatory response

Alycia N. Galindo, David A. Frey Rubio and Marian H. Hettiaratchi*



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

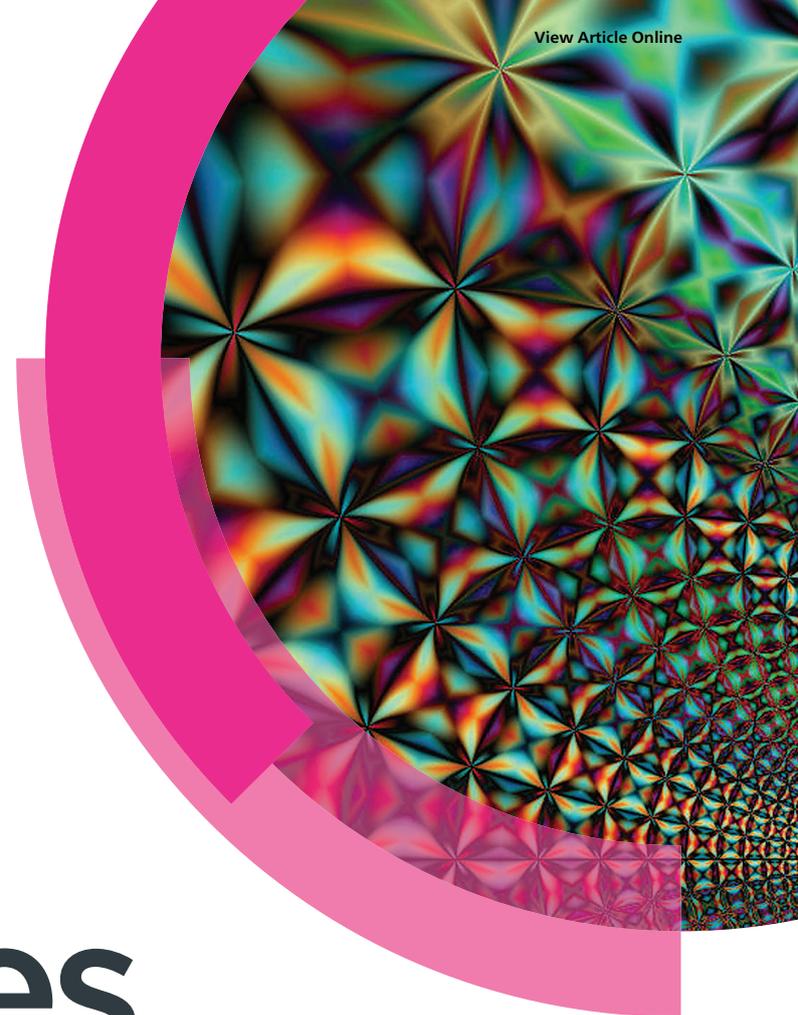


Community Led by active researchers, we publish quality work from scientists at every career stage, and all countries

Submit your work now

rsc.li/rsc-advances

@RSC_Adv

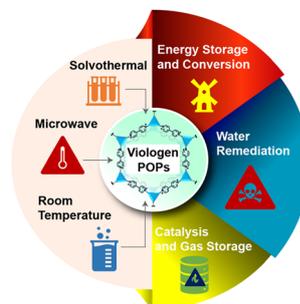


REVIEWS

4055

Recent advancement in viologen functionalized porous organic polymers (vPOPs) for energy and environmental remediation

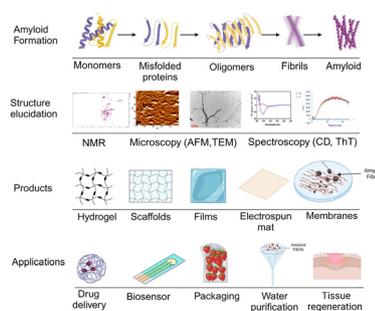
Pampa Jhariat and Tamas Panda*



4078

Advancements in amyloid-based biological materials for healthcare, environmental and sensing applications

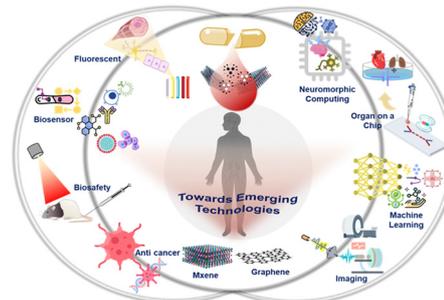
Smriti Singh Yadav, Prabeen Kumar Padhy, Ashish Kumar Singh, Supriya Sharma, Tanu, Siraj Fatima, Anurag Sinha, Ramsha Tariq, Varsha, Sandeep K. Sharma and Smriti Priya*



4091

Tailored MXenes and graphene as efficient telemedicine platforms for personalized health wellness

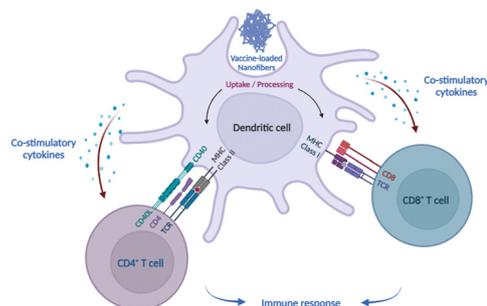
Kamil Reza Khondakar,* Divya Tripathi, Hira Mazumdar,* Kirti Ahuja and Ajeet Kaushik



4112

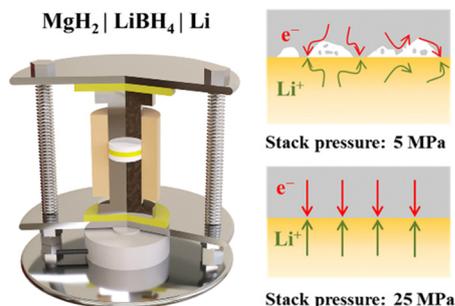
From antigen uptake to immune modulation: the multifaceted potential of peptide nanofibers as vaccine nanocarriers

Hatem A. F. M. Hassan,* Mohamed Haider and Sherif Ashraf Fahmy



COMMUNICATIONS

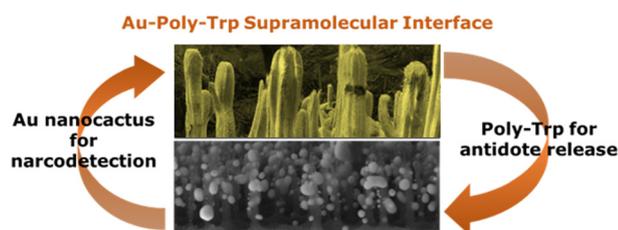
4131



Enhancing the cycling performance of MgH_2 - LiBH_4 based solid-state batteries via stacking pressure tailoring

Xueye Zhuang, Haoliang Chen, Shiman He,* Long Hu, Hui Wang* and Renzong Hu*

4136

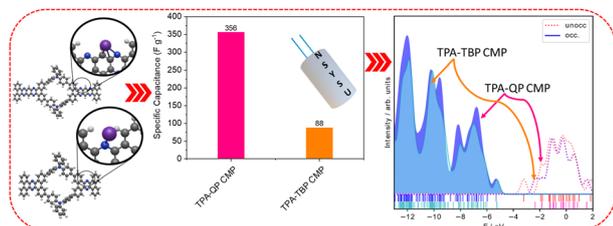


Free-base amino acid-encoded microsystems for dual detection of narcotics and therapeutic antidote monitoring

Sarvesh Kumar Srivastava

PAPERS

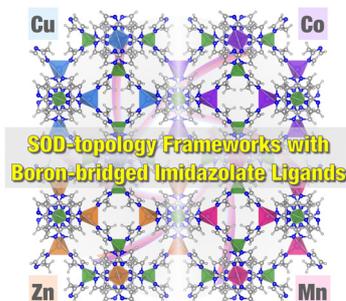
4142



Phenazine-integrated conjugated microporous polymers for modulating the mechanics of supercapacitor electrodes

Mohammed G. Kotp, Johann Lüder, Shiao-Wei Kuo and Ahmed F. M. EL-Mahdy*

4151



Boron-imidazolate coordination networks with 3d transition metals for enhanced CO_2 adsorption capability

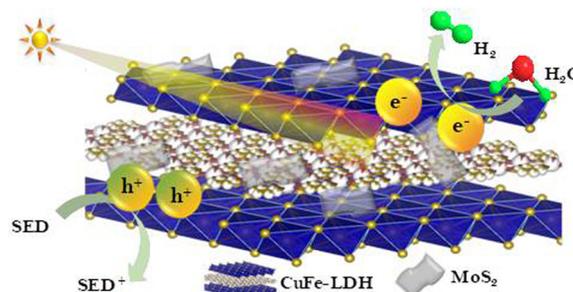
Takeshi Kato, Ikuho Akiyama, Fumika Mori, Ayumu Shinohara, Yudai Ogura, Akitaka Ito and Masataka Ohtani*



4159

Surface engineering of a 2D CuFe-LDH/MoS₂ photocatalyst for improved hydrogen generation

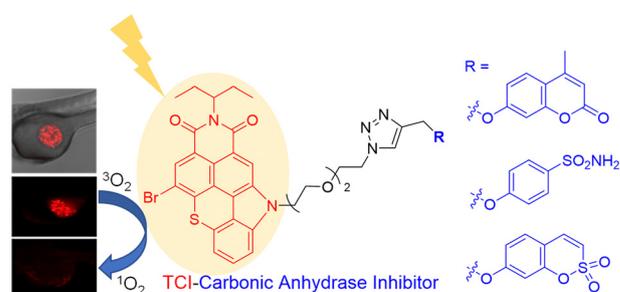
Chandra Shobha Vennapoosa, Sandip Prabhakar Shelake, Bhavya Jaksani, Aparna Jamma, B. Moses Abraham, Annadanam V. Sesa Sainath, Mohsen Ahmadipour and Ujjwal Pat*



4172

Thiochromenocarbazole imide-based photosensitizers decorated with carbonic anhydrase inhibitors for the targeted treatment of hypoxic tumours

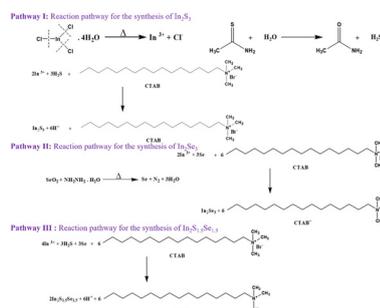
Amina Merabti, Dario Puchán Sánchez, Alessio Nocentini, Lamiaa M. A. Ali, Christophe Nguyen, Denis Durand, Kathleen Hamon, Tatiana Ghanem, Philippe Arnoux, Pierre Josse, Céline Frochot, Raivis Zalubovskis, Sébastien Richeter, Magali Gary-Bobo, Claudiu T. Supuran, Clément Cabanetos, Jean-Yves Winum* and Sébastien Clément*



4178

High performance photodetectors based on In₂S₃, In₂S_{1.5}Se_{1.5} and In₂Se₃ nanostructures

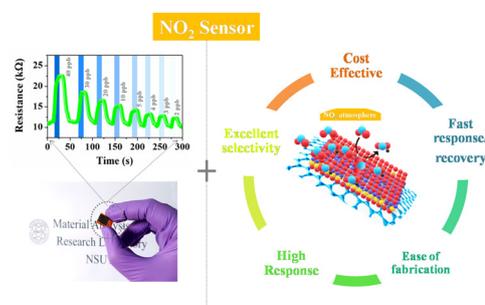
Ankurkumar J. Khimani,* Sujit A. Kadam,* Ranjan Kr. Giri, Chetan K. Zankat and Yuan-Ron Ma



4187

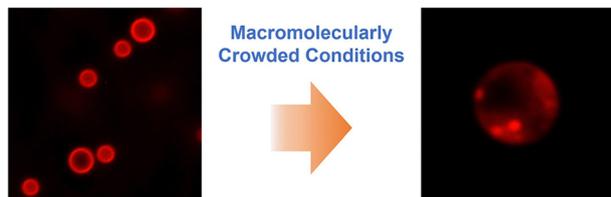
Fabrication of a room-temperature NO₂ gas sensor with high performance at the ppb level using an rGO/BiOCl heterostructure

Neeraj Dhariwal, Preeti Yadav, Amit Sanger, Sung Bum Kang, M. S. Goyat, Yogendra Kumar Mishra and Vinod Kumar*



4200

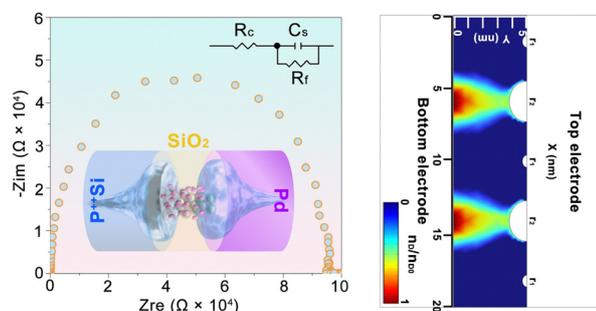
Phase Transition of Globular Protein Vesicles In Macromolecularly Crowded Conditions



Phase transition of recombinant fusion protein assemblies in macromolecularly crowded conditions

Jooyong Shin, Yinhao Jia, Janani Sampath and Yeongseon Jang*

4209



High on/off ratio SiO₂-based memristors for neuromorphic computing: understanding the switching mechanisms through theoretical and electrochemical aspects

Fei Qin, Yuxuan Zhang, Ziqi Guo, Tae Joon Park, Hongsik Park, Chung Soo Kim, Jeongmin Park, Xingyu Fu, Kwangsoo No, Han Wook Song, Xiulin Ruan and Sunghwan Lee*

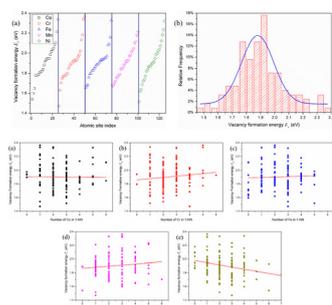
4221



Gold nanoparticle-loaded MoS₂ nanosheets with peroxidase-like and pyranose oxidase-like activities for bio-enzyme-free visual detection of glucose, xylose and galactose

Shilan Fu, Junfeng Liu, Siqi Wu, Lin Zhang, Xu Zhang* and FengFu Fu*

4231



Defect energetics in an high-entropy alloy fcc CoCrFeMnNi

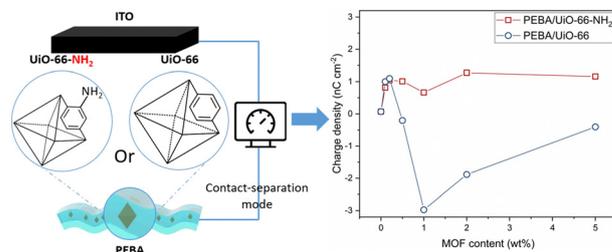
Chan Gao,* Shuyu Wang, Xiao Liu and Chandra Veer Singh*



4242

Controlling the magnitude and polarity of surface charges in PEBA polymers by adding UIO-66 MOFs

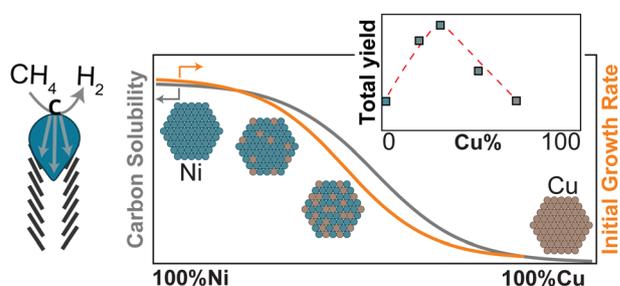
Linards Lapčinskis, Andris Šutka,* Martynas Kinka,* Fa-Kuen Shieh,* Līva Ģērmane, Sergejus Balčiūnas, Artis Linarts and Robertas Grigalaitis



4251

Balancing act: influence of Cu content in NiCu/C catalysts for methane decomposition

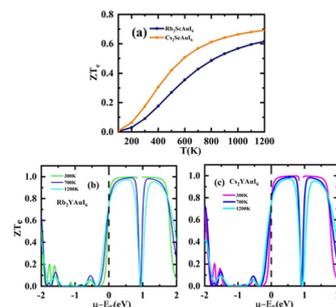
Suzan E. Schoemaker, Stefan Bismeyer, Dennie F. L. Wezendonk, Johannes D. Meeldijk, Tom A. J. Welling* and Petra E. de Jongh*



4262

A DFT exploration of the optoelectronic and thermoelectric features of a novel halide double perovskite A₂YAul₆ (A = Rb, Cs) for solar cell and renewable energy applications

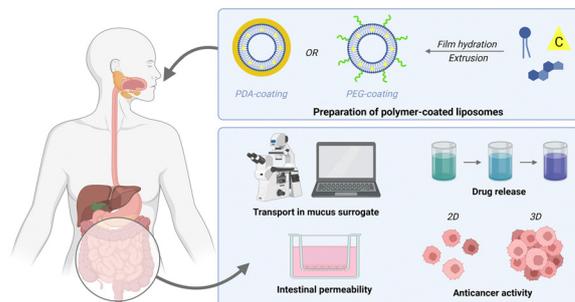
Abrar Nazir, Aparna Dixit, Ejaz Ahmad Khera,* Mumtaz Manzoor, Ramesh Sharma and A. J. A. Moayad*



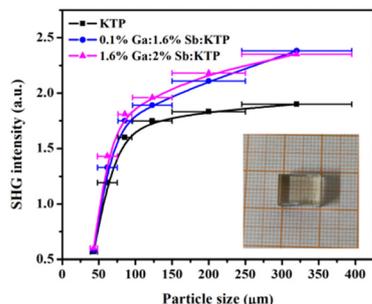
4276

Impact of polyethylene glycol and polydopamine coatings on the performance of camptothecin-loaded liposomes for localised treatment of colorectal cancer

Anna Maria Maurelli, Bárbara Ferreira, Sofia Dias, Helena Almeida, Vincenzo De Leo,* Bruno Sarmento, Lucia Catucci* and José das Neves*



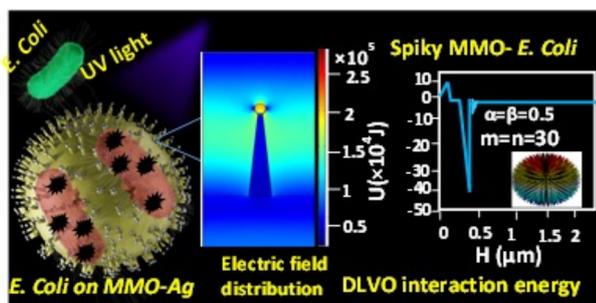
4286



The effect of co-substitution of heterovalent ions Ga^{3+} and Sb^{5+} on nonlinear optical properties of phosphate crystals

Yutong Zhang, Biao Wang, Xinhui Jia, Xi Chong, Jing Li,* Bingbing Zhang* and Jiyang Wang

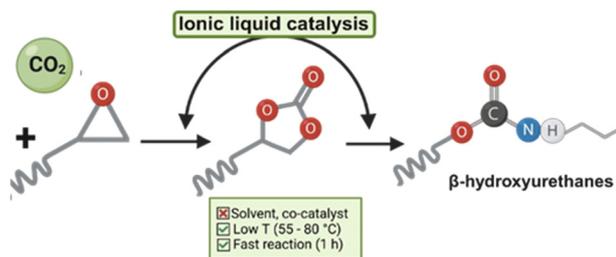
4293



Self-cleaning formulations of mixed metal oxide-silver micro-nano structures with spiky corone as antimicrobial coatings for fabrics and surfaces

Ramya Prabhu B, Bhamy Maithry Shenoy, Manish Verma, Soumyashant Nayak, Gopalkrishna Hegde and Neena S. John*

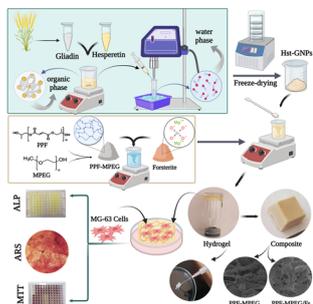
4311



Fast carbon dioxide-epoxide cycloaddition catalyzed by metal and metal-free ionic liquids for designing non-isocyanate polyurethanes

Marwa Rebei, Ctirad Červinka, Andrii Mahun, Petra Ecorchard, Jan Honziček, Sébastien Livi, Ricardo K. Donato and Hynek Beneš*

4324



A forsterite-reinforced polypropylene fumarate/methoxy polyethylene glycol-hydrogel enriched with flavonoid nanoparticles enhances osteoconductivity

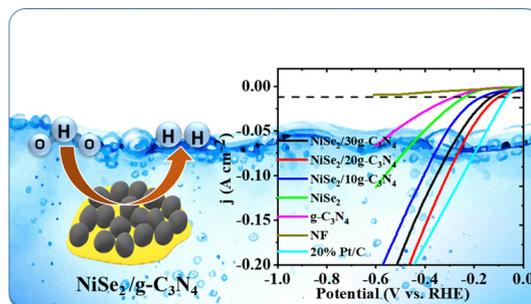
Mahsa Zaghian, Jaleh Varshosaz,* Mahboubeh Rostami and Mina Mirian



4345

In situ growth of NiSe₂ nanoparticles on g-C₃N₄ nanosheets for an efficient hydrogen evolution reaction

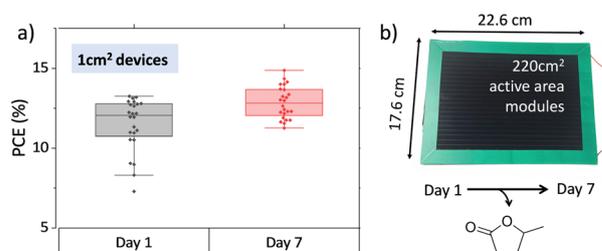
Somnath R. Khaladkar, Oshnik Maurya, Girish Gund, Bhavesh Sinha, Girish Kamble, Jin Hyeok Kim,* R. R. Deshmukh* and Archana Kalekar*



4354

Age-induced excellence with green solvents: the impact of residual solvent and post-treatments in screen-printed carbon perovskite solar cells and modules

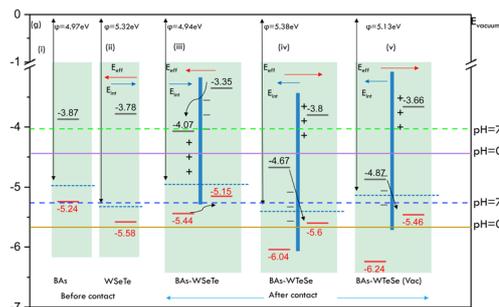
Carys Worsley,* Sarah-Jane Potts, Declan Hughes, Wing Chung Tsoi and Trystan Watson*



4366

Enhanced photocatalytic water splitting with two-dimensional van der Waals heterostructures of BAs/WTeSe

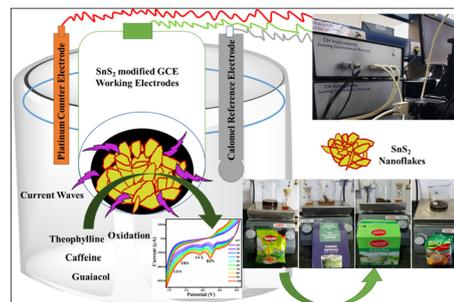
BiBi Hanifan, Abdul Jalil, Syed Zafar Ilyas, Azeem Ghulam Nabi* and Devis Di Tommaso*



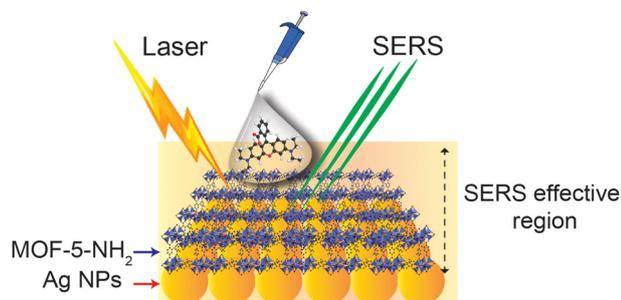
4378

Highly sensitive and selective electrochemical detection of caffeine, theophylline and guaiacol in green tea, green coffee, coffee, and tea extracts using a SnS₂ nanoflake-modified electrode

Amisha Kushwaha, Gajendar Singh, Umesh Kumar Gaur and Manu Sharma*



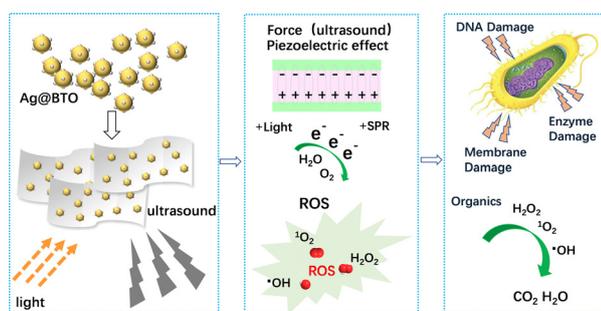
4401



Integrating the amino-functionalized MOF-5 film with the silver nanoparticle substrate for a high SERS enhancement effect and long-term stability

Nguyen La Ngoc Tran, Le Hong Tho, Ngoc Quang Tran, Hanh Kieu Thi Ta, Bach Thang Phan, Nguyet N. T. Pham, Tan Le Hoang Doan* and Nhu Hoa Thi Tran*

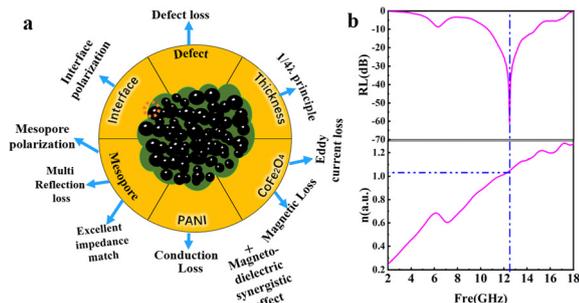
4409



A heterostructure nanofiber film with an enhanced internal electrical field and surface plasmon resonance for efficient microbial removal

Wanting Li, Jing Yang, Xin Gao, Yiqian Fu, Huiyu He, Pu Wang, Yudong Hou, Mankang Zhu and Xiu-Hong Wang*

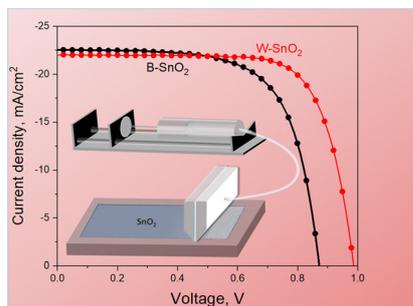
4421



A coral-like nano-PCF composite as a broad-bandwidth microwave absorber

Aiqiong Wang, Jianxiong Li and Xiaoming Zhao*

4430



Slot-die coating of electron transport layers for perovskite solar cells using water and butanol-based tin oxide dispersions

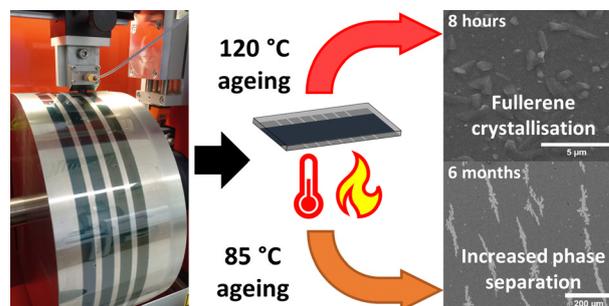
Anuja Vijayan, Vishnu Vijayakumar, Malin B. Johansson, Masoud Karimipour, Monica Lira-Cantu, Byeong Jo Kim and Gerrit Boschloo*



4438

Investigation of different degradation pathways for organic photovoltaics at different temperatures

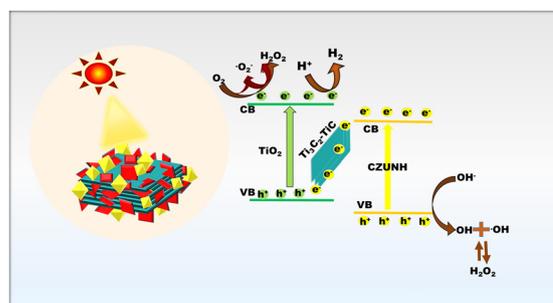
Bradley P. Kirk, Amira R. Alghamdi, Matthew J. Griffith, Xun Pan, Martyn Jevric, David A. Lewis, Gunther G. Andersson and Mats R. Andersson*



4452

Aggrandized photocatalytic H_2O_2 and H_2 production by a $\text{TiO}_2/\text{Ti}_3\text{C}_2-\text{TiC}$ /mixed metal $\text{Ce}-\text{Zr}$ MOF composite: an interfacial engineered solid-state-mediator-based Z-scheme heterostructure

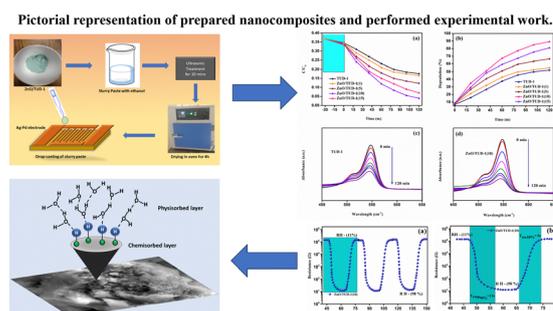
Lijarani Biswal, Suraj Prakash Tripathy, Srabani Dash, Sarmistha Das, Satyabrata Subudhi and Kulamani Parida*



4467

A three-dimensional ZnO/TUD-1 nanocomposite-based multifunctional sensor for humidity detection and wastewater remediation

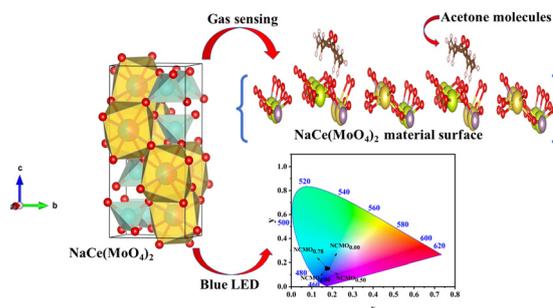
Aryan Boora, Surender Duhan,* Bhavna Rohilla, Priya Malik, Supriya Sehrawat, M. S. Goyat, Yogendra Kumar Mishra and Vinod Kumar



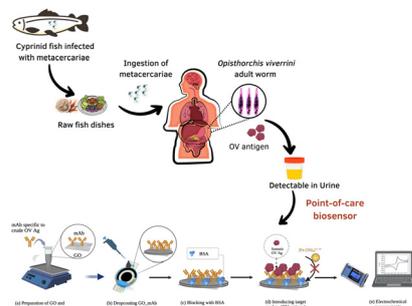
4480

A truncated octahedron $\text{NaCe}(\text{MoO}_4)_2$ nanostructure: a potential material for blue emission and acetone sensing

Nibedita Haldar, Tanmoy Mondal, Tanushri Das, Debabrata Sarkar, Mrinal Pal, Asiful H. Seikh and Chandan Kumar Ghosh*



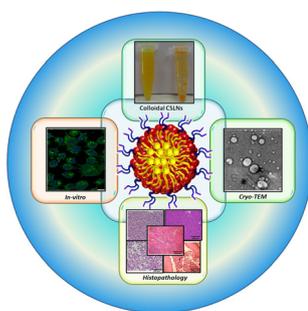
4491



Functionalized graphene oxide–antibody conjugate-based electrochemical immunosensors to detect *Opisthorchis viverrini* antigen in urine

Nang Noon Shean Aye, Pornsuda Maraming, Patcharaporn Tippayawat, Sakda Daduang, Anchalee Techasen, Wassana Jammongkan, Paiboon Sithithaworn and Jureerut Daduang*

4504



Selective induction of apoptotic cell death in lung carcinoma cells by curcumin-loaded PEGylated lipid nanoparticles with minimal normal tissue toxicity: *in vitro* and *in vivo* toxicity evaluation by oral delivery

Bijaideep Dutta, Sourav Kumar Das, Mayur Temgire, Jayesh Bellare, K. C. Barick,* Amit Kumar and P. A. Hassan*

