

# Materials Advances

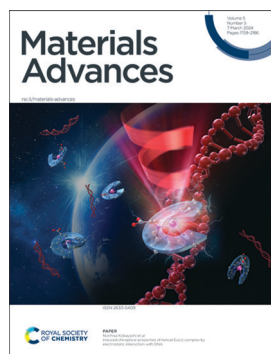
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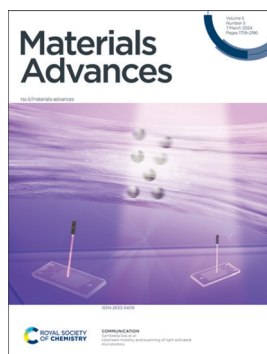
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ISSN 2633-5409 CODEN MAADC9 5(5) 1759-2186 (2024)



### Cover

See Norihisa Kobayashi *et al.*, pp. 1897–1902. Image reproduced by permission of Norihisa Kobayashi from *Mater. Adv.*, 2024, 5, 1897.



### Inside cover

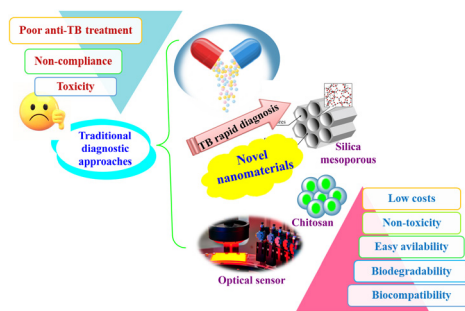
See Sambaeta Das *et al.*, pp. 1875–1879. Image reproduced by permission of Sambaeta Das from *Mater. Adv.*, 2024, 5, 1875.

## REVIEWS

1772

### Advances in the fabrication of potential nanomaterials for diagnosis and effective treatment of tuberculosis

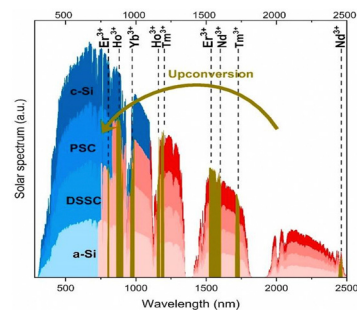
Rehan M. El-Shabasy,\* Moustafa Zahran, Ahmed H. Ibrahim, Yasmin R. Maghraby and Mohamed Nayel



1783

### Upconversion as a spear carrier for tuning photovoltaic efficiency

Nikita Chaudhary, Mansi Pahuja and Kaushik Ghosh\*



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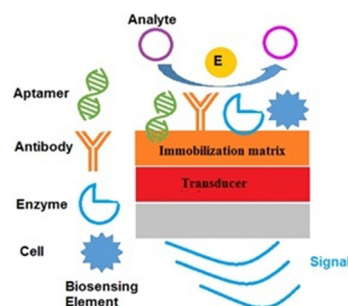
Fundamental questions  
Elemental answers

## REVIEWS

1803

**Borophene nanomaterials: synthesis and applications in biosensors**

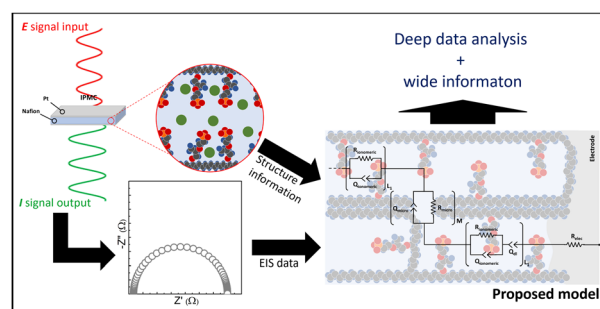
Gourang Hari Gupta, Shikha Kadakia, Darshan Agiwal, Tanya Keshari and Suveen Kumar\*



1817

**Review on the use of impedance spectroscopy for IPMC-like devices: application, models, and a new approach to data treatment**

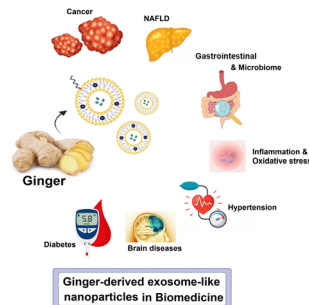
Roger Gonçalves,\* Kaique Afonso Tozzi, Matheus Colovati Saccardo, Ariel Gustavo Zuquello, Rafael Barbosa, Guilherme Eduardo de Oliveira Blanco, Laos Alexandre Hirano and Carlos Henrique Scuracchio



1846

**A comprehensive review on ginger-derived exosome-like nanoparticles as feasible therapeutic nano-agents against diseases**

Faegheh Bahri, Mahna Mansoori, Shayan Vafaei, Saba Fooladi, Yousof Mir, Mehrnaz Mehrabani, Yaser Hozhabri, Mohammad Hadi Nematollahi\* and Siavash Irvani\*

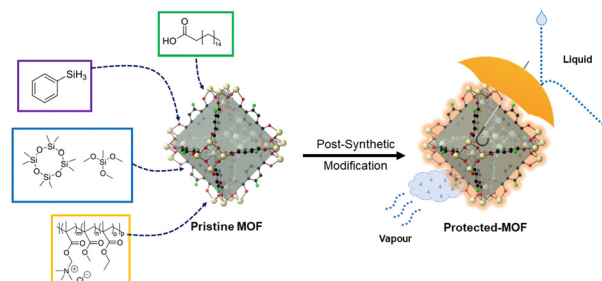


## COMMUNICATIONS

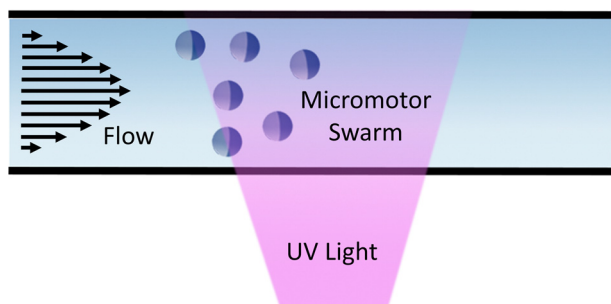
1868

**The Gore-Tex® effect in externally hydrophobic Metal–Organic Frameworks**

Kaleb L. Miller, Rijia Lin, Jingwei Hou, Cameron J. Kepert,\* Deanna M. D'Alessandro\* and Marcello B. Solomon\*



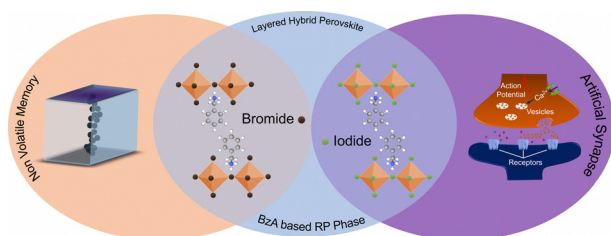
1875



### Upstream mobility and swarming of light activated micromotors

Bingzhi Wu, David P. Rivas and Sambaeta Das\*

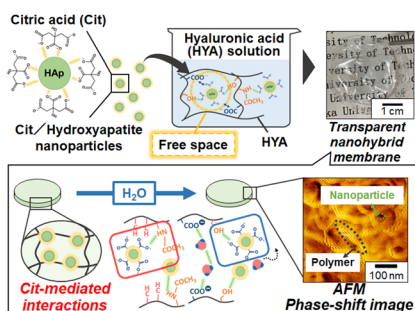
1880



### Resistive switching in benzylammonium-based Ruddlesden–Popper layered hybrid perovskites for non-volatile memory and neuromorphic computing

Mubashir M. Ganaie, Gianluca Bravetti, Satyajit Sahu, Mahesh Kumar\* and Jovana V. Milić\*

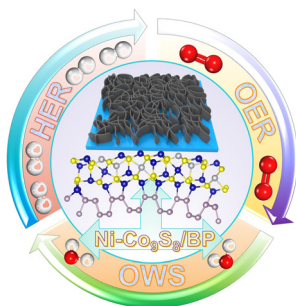
1887



### Preparation of hydroxyapatite nanoparticle-hyaluronic acid hybrid membranes through citric acid molecular mediation

Aoi Endo, Zizhen Liu, Daichi Noda, Mari Miyata and Motohiro Tagaya\*

1892



### A defective NiCo-pentlandite/black phosphorus heterostructure for efficient water splitting electrocatalysis

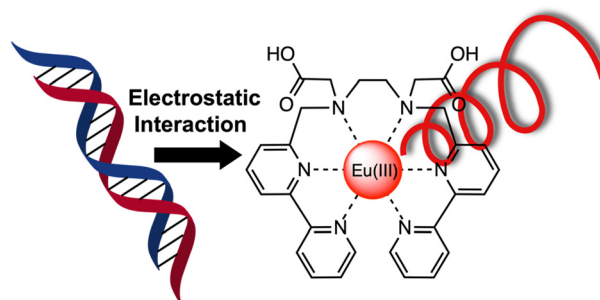
Hang Liu, Yahui Tian, Syama Lenus, Xin Zhao, Zhengfei Dai and Tingting Liang\*



1897

### Induced chiroptical properties of helical Eu(III) complex by electrostatic interaction with DNA

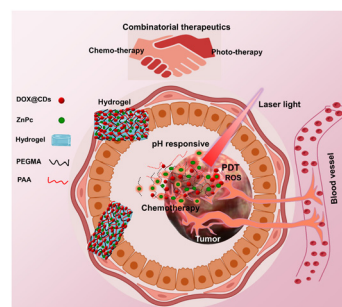
Ziying Li, Nana Hitomi, Hideyuki Tanaka, Hitomi Ohmagari, Kazuki Nakamura, Miki Hasegawa and Norihisa Kobayashi\*



1903

### A photoarchitectonic hydrogel for synergistic *in vitro* chemo–phototherapy of breast cancer

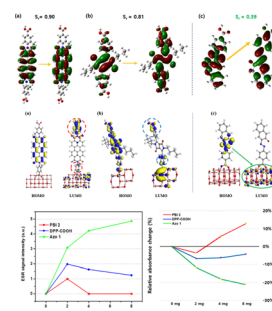
Shatabdi Paul, Binduma Yadav, Mahesh D. Patil, Anil Kumar Pujari, Umesh Singh, Vikas Rishi and Jayeeta Bhaumik\*



1917

### Enhancing the reliability of dyes for color filters through TiO<sub>2</sub> adsorption: comprehensive identification of factors affecting photocatalysis

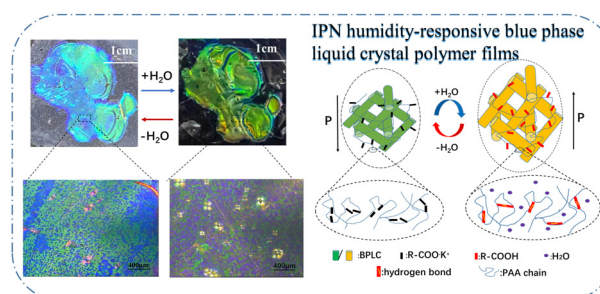
Wan Soo Kim, So Jeong Park, Tae Gyu Hwang, Hong Mo Kim, Hyun Kyu Lee, Suhyeon Kim, Woo Jin Choi, Jun Ho Yoon, Yoo Sang Kim, Dong Jun Lee, Seong Hyun Jang, Jin Young Kim\* and Jae Pil Kim\*



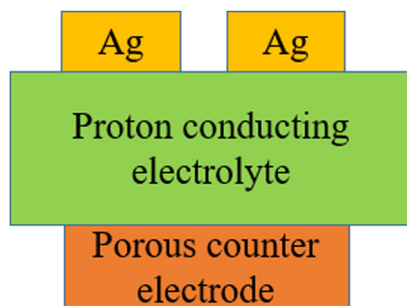
1930

### A blue phase liquid crystal film based on an interpenetrating network and its sensitive humidity response performance

Wentuo Hu, Wanli He,\* Kainan Wang, Changli Zhang, Zhou Yang, Yuzhan Li, Hui Cao and Dong Wang



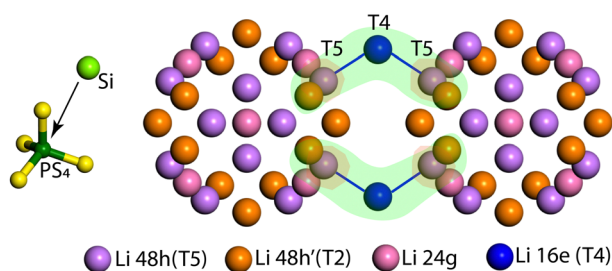
1940



### Fabrication and preliminary testing of patterned silver cathodes for proton conducting IT-SOFCs

Md Shariful Islam Sozal, Wenhao Li, Suprabha Das, Borzooye Jafarizadeh, Azmal Huda Chowdhury, Chunlei Wang and Zhe Cheng\*

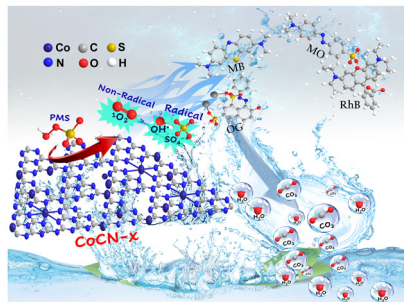
1952



### Understanding the role of aliovalent cation substitution on the li-ion diffusion mechanism in $\text{Li}_{6+x}\text{P}_{1-x}\text{Si}_x\text{S}_5\text{Br}$ argyrodites

Tammo K. Schwieter, Ajay Gautam, Anastasia K. Lavrinenko, David Drost, Theodosios Famprikis, Marnix Wagemaker\* and Alexandros Vasileiadis\*

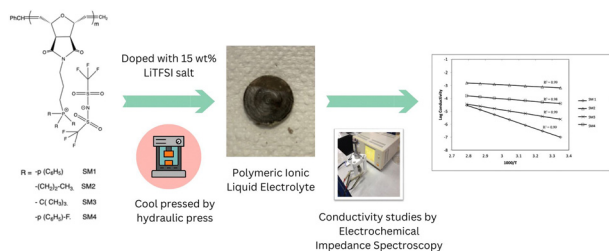
1960



### Novel chemically reduced cobalt-doped $\text{g-C}_3\text{N}_4$ ( $\text{CoCN-x}$ ) as a highly heterogeneous catalyst for the super-degradation of organic dyes via peroxymonosulfate activation

Aboubakr Ben Hamou,\* Mohamed Enneimy,\* Salaheddine Farsad, Asma Amjlef, Ayoub Chaoui, Nisrine Nouj, Ali Majdoub, Amane Jada,\* Mohamed Ez-zahery and Nouredine El Alem\*

1977



### Synthesis of oxanorbornene-based phosphonium polymeric ionic liquids (PILs) and investigation of their electrical properties

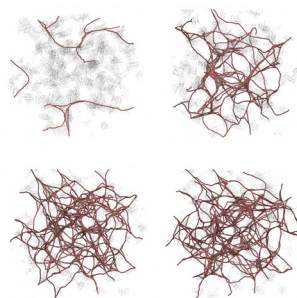
M. S. M. Misenan, N. Ceren Süer, N. Yılmaz Canli, A. S. A. Khair\* and T. Eren\*



1991

### Crosslinker energy landscape effects on dynamic mechanical properties of ideal polymer hydrogels

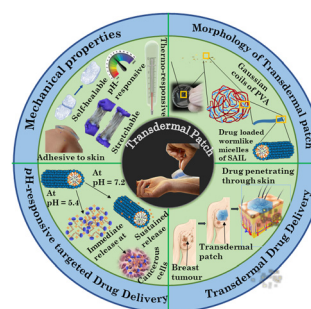
Eesha Khare, Amadeus C. S. de Alcântara, Nic Lee, Munir S. Skaf and Markus J. Buehler\*



1998

### PVA/guanidinium oleate transdermal patch as a pH-responsive drug delivery system for the localized and targeted delivery of anticancer drugs

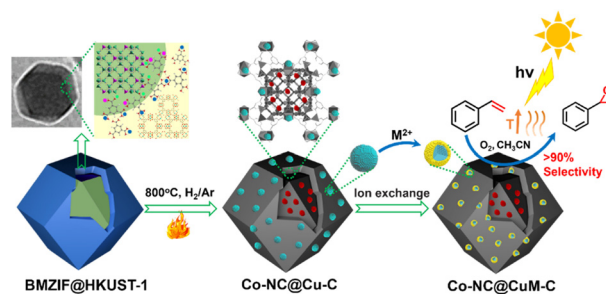
Monika Jain, Raviraj Pansuriya, Rahul Thakur, Adesh K. Saini, Sugam Kumar, Vinod K. Aswal, Suresh Kumar Kailasa and Naved I. Malek\*



2012

### Trimetallic MOF1@MOF2 heterostructure derived Co-NC@CuM-C for enhanced photothermal catalysis in styrene epoxidation

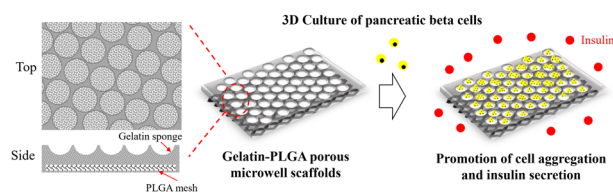
Xinliu Zhao, Fusheng Liu, Yu-Zhen Chen\* and Zhibo Li\*



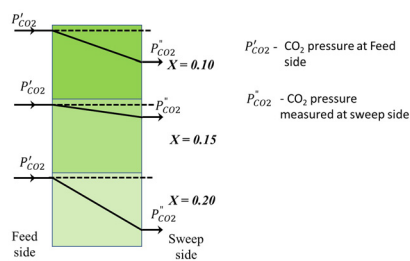
2019

### Porous microwell scaffolds for 3D culture of pancreatic beta cells to promote cell aggregation and insulin secretion

Huajian Chen, Tianjiao Zeng, Toru Yoshitomi, Naoki Kawazoe, Hirotake Komatsu, Yingnan Yang and Guoping Chen\*



2027

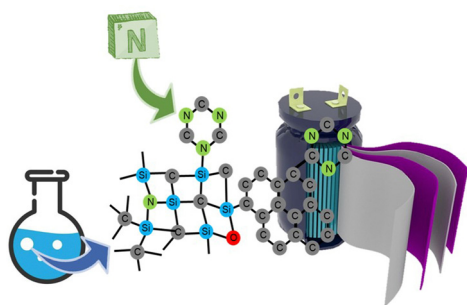


CO<sub>2</sub> permeation through Ce<sub>1-x</sub>Gd<sub>x</sub>O<sub>2-δ</sub>-LiNaCO<sub>3</sub> (80:20 v%) composite membranes of different oxide ion conducting domains

## Optimization of safe doping level for enhanced CO<sub>2</sub> flux in composite membrane

Atul P. Jamale\* and Gonçalo Henriques

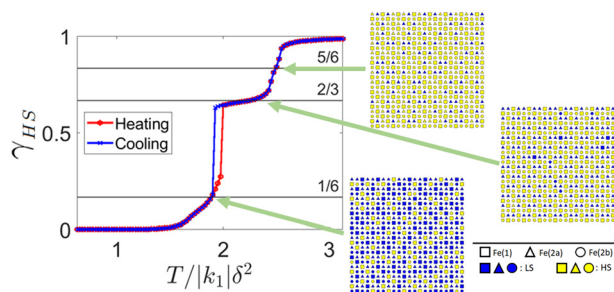
2040



## Innovative strategies for nitrogen-incorporating silicon oxycarbide-based preceramic polymer synthesis

B. Pérez-Román,\* A. Merchán del Real, J. Rubio, M. A. Mazo and F. Rubio-Marcos

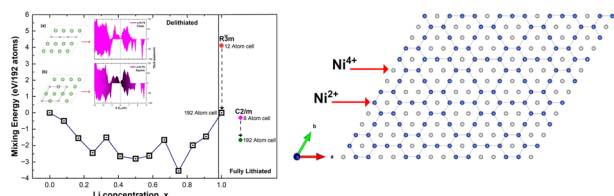
2057



## Multistep transitions in spin crossover materials without long-range spin state order from dimensional reduction

Gian Ruzzi, Jace Cruddas and Benjamin J. Powell\*

2069



## Structures and electronic states of nickel-rich oxides for lithium ion batteries

Saleem Yousuf, Md Maruf Mridha and Rita Magri\*

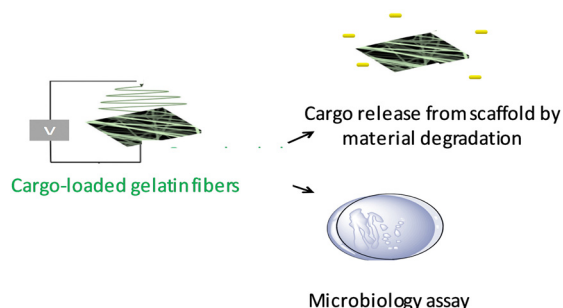




2088

### Antibiotic-loaded gelatin fibers fighting bacteria resistant to antibiotics: a case of spectinomycin-resistant *Escherichia coli*

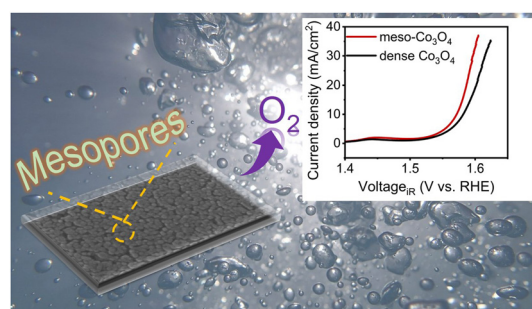
Laura Larue, Laurent Michely, Xenia Moreno, Rémy Pires, André Pawlak, Daniel Grande and Sabrina Belbekhouche\*



2098

### Soft-templated, mesoporous $\text{Co}_3\text{O}_4$ thin films for electrocatalysis of the oxygen evolution reaction

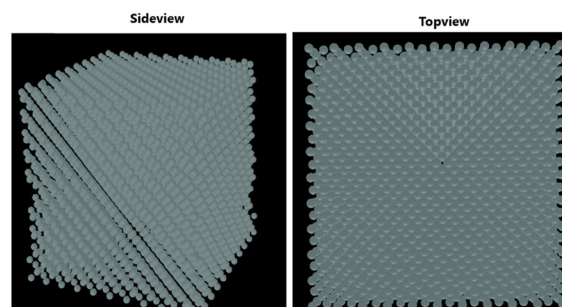
Qingyang Wu, Maximilian Mellin, Stefan Lauterbach, Chuanmu Tian, Christian Dietz, Jan P. Hofmann and Marcus Einert\*



2110

### Atomistic insights into predictive *in silico* chemical vapor deposition

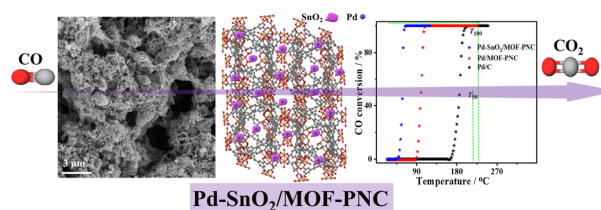
P. K. Saxena,\* P. Srivastava, Anshika Srivastava and Anshu Saxena



2120

### Metal–organic framework-derived hierarchical porous N/Co-doped carbon-supported sponge-like Pd– $\text{SnO}_2$ nanostructures for low-temperature CO oxidation

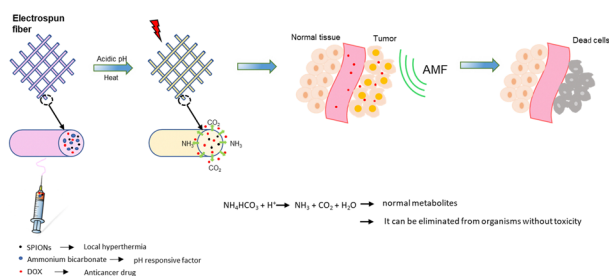
Adewale K. Ipadeola, Ahmed Gamal, Belal Salah, Yassmin Ibrahim, Aboubakr M. Abdullah,\* Aderemi B. Haruna, Kenneth I. Ozoemena\* and Kamel Eid\*



Pd-SnO<sub>2</sub>/MOF-PNC



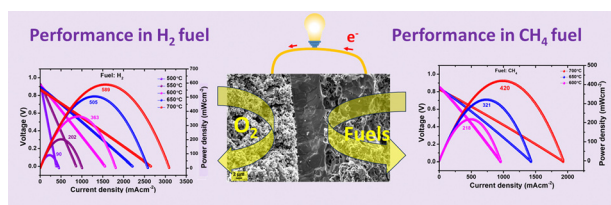
2128



### pH-sensitive composite nanofibers of poly( $\epsilon$ -caprolactone) loaded with iron oxide nanoparticles/ammonium bicarbonate as a nanocarrier toward efficient doxorubicin release for postsurgical cancer treatment

Quang Nhat Quynh Vo, Abdelrahman I. Rezk, Sungkun Chun,\* Chan Hee Park\* and Cheol Sang Kim\*

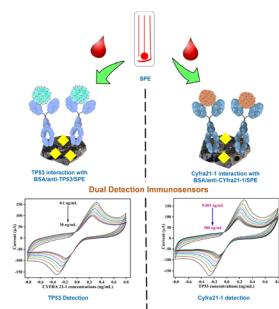
2140



### Dual-phase Yb-doped $\text{La}_2\text{Ce}_2\text{O}_7$ materials for fuel flexible SOFCs

Bishnu Choudhary\* and Shahid Anwar\*

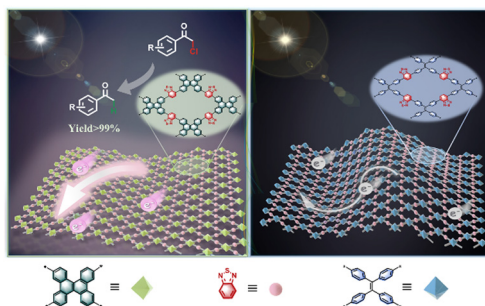
2153



### Disposable paper-based screen-printed electrochemical immunoplatform for dual detection of esophageal cancer biomarkers in patients' serum samples

Damini Verma, Neha Dubey, Amit K. Yadav, Anoop Saraya, Rinu Sharma\* and Pratima R. Solanki\*

2169



### Efficient photocatalytic chloride dehalogenation by planar conjugated microporous polymers with enhanced charge separation and transport

Hao Zhang, Sizhe Li, Zhuangfei Qian, Jie Yin, Wenxin Wei,\* Yan Zhao\* and Kai A I Zhang



2175

## pH-sensitive peptide hydrogel encapsulating the anti-angiogenesis drug conbercept and chemotherapeutic drug dox as a combination therapy for retinoblastoma

Wen Fan, Mingkang Chen, Faisal Raza, Hajra Zafar, Faryal Jahan, Yuejian Chen, Lexin Ge, Minyan Yang\* and Yiqun Wu\*

