

# Materials Advances

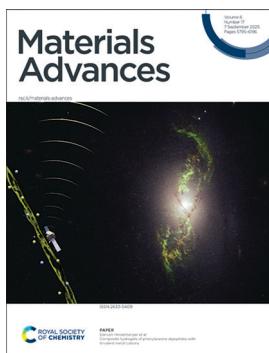
An open access journal publishing across the breadth of materials science

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 6(17) 5795–6196 (2025)



### Cover

See Dariush Hinderberger et al., pp. 5864–5876.

Image reproduced by permission of Dariush Hinderberger from *Mater. Adv.*, 2025, 6, 5864.

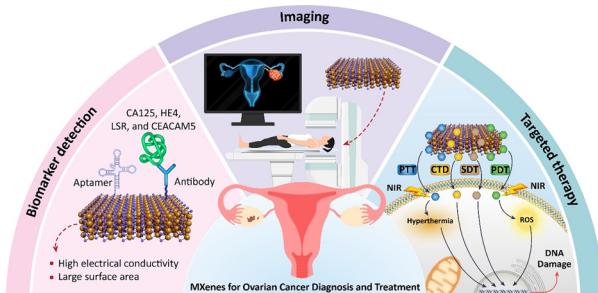
Image edited by Lisa Krahnefeld (Martin Luther University Halle-Wittenberg, Germany), built on an original image by NASA, ESA, W. Keel (University of Alabama, USA), CC BY 4.0 (<http://creativecommons.org/licenses/by/4.0/>).

## REVIEWS

5807

### Advancing ovarian cancer care: recent innovations and challenges in the use of MXenes and their composites for diagnostic and therapeutic applications

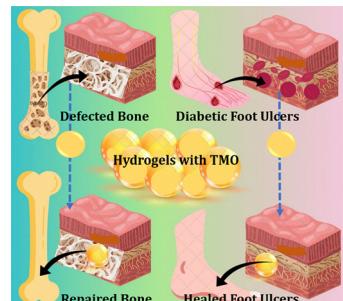
Neda Farzizadeh, Atefeh Zarepour, Arezoo Khosravi, Siavash Iravani\* and Ali Zarabi\*



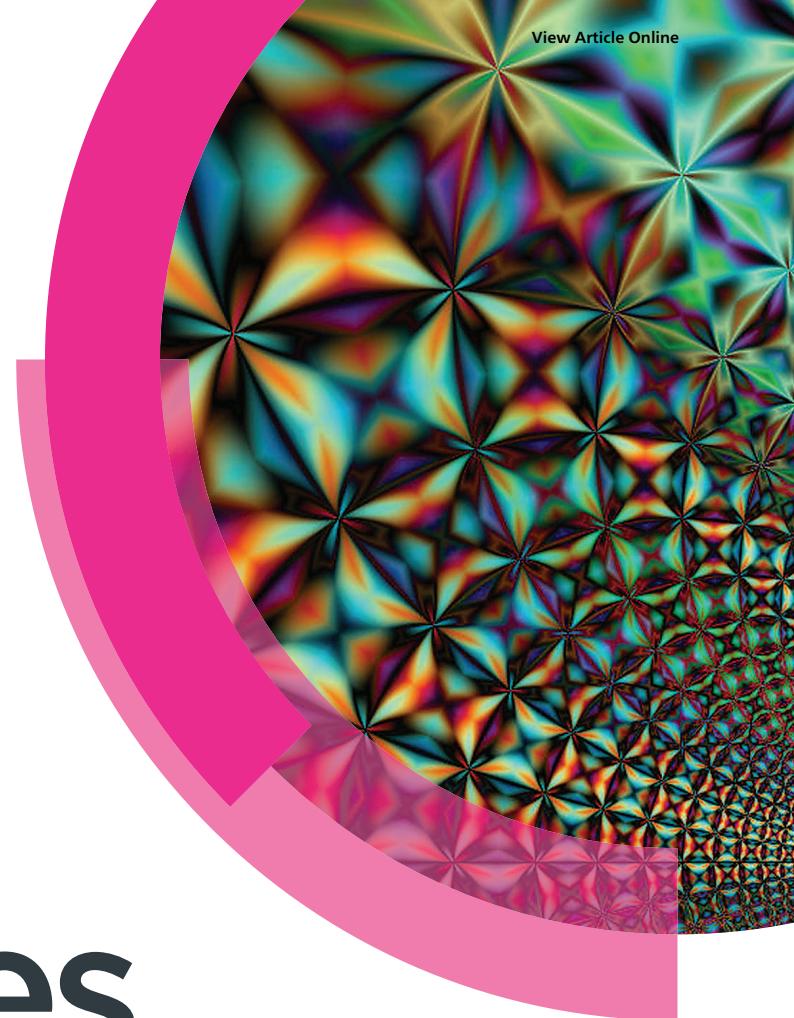
5831

### Unveiling the development principles and mechanistic understanding of controlled drug delivery strategies for chronic bone defects and diabetic wound management

Shikha Awasthi



# 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](http://rsc.li/rsc-advances)

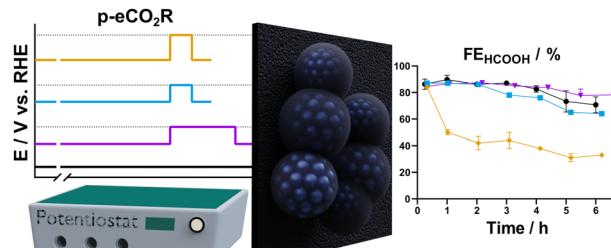
@RSC\_Adv

## COMMUNICATION

5857

**Countering *in situ* reduction of SnO<sub>2</sub> during electrochemical CO<sub>2</sub> conversion *via* oxidative pulsing**

Sven Arnouts, Kevin Van Daele, Nick Daems, Mathias van der Veer, Sara Bals and Tom Breugelmans\*

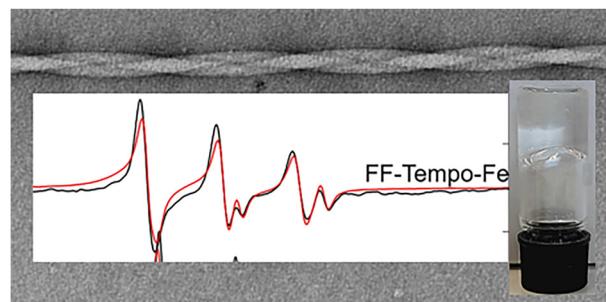


## PAPERS

5864

**Composite hydrogels of phenylalanine dipeptides with trivalent metal cations**

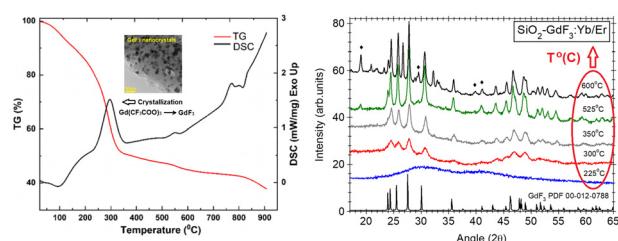
Melissa Kemesies, Vanessa Jerschabek, Chife Ekene Fidelis, Jonas Volmer, Anna Franziska Roth, Christian Schwieger, Annette Meister, Haleh Hashemi Haeri and Dariush Hinderberger\*



5877

**Unravelling the crystallization mechanism and structural evolution of Yb/Er-doped SiO<sub>2</sub>-GdF<sub>3</sub> nano-glass ceramics**

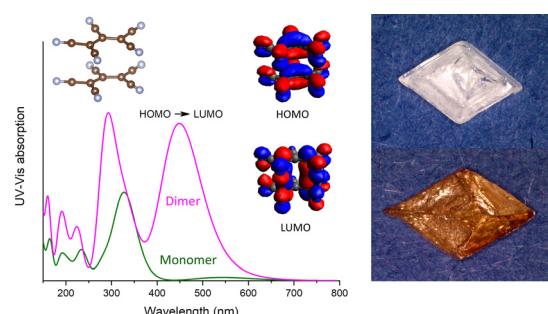
C. E. Secu, C. Bartha and M. Secu\*



5884

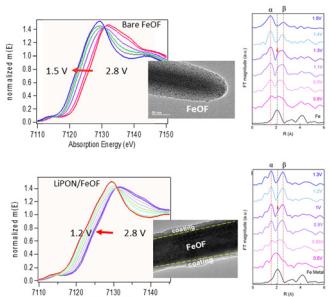
**Fluorescence from pentacyanopropenide in melamine**

Hanen Mechi, Arthur Mantel, Vipin Mishra, Yuto Urano, Ryo Kitaura and Hidetsugu Shiozawa\*



## PAPERS

5892

**Oversaturated Li-FeOF solid solutions developed using LiPON interfacial coating**

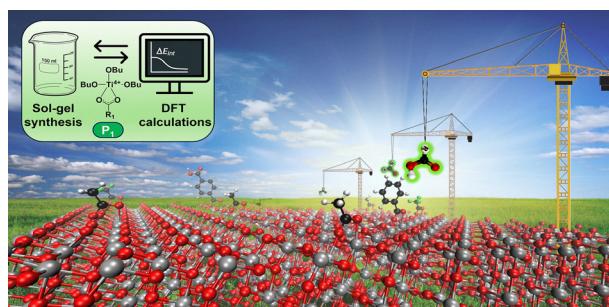
Haotian Wang, Binh Hoang, Feng Wang, Sz-Chian Liou, Chunsheng Wang, Gary Rubloff and Chuan-Fu Lin\*

5901

**Hollow porous molecularly imprinted polymer for xylose detection in sugarcane bagasse by dispersive solid-phase extraction**

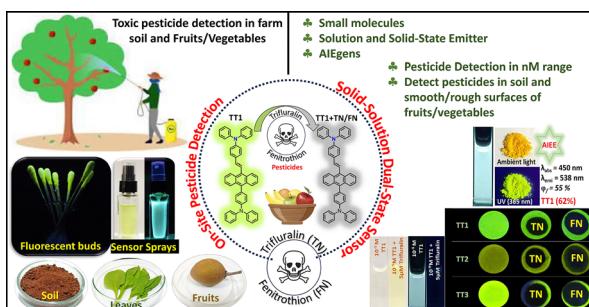
Diogo Hideki Moriya, Cláudio Fernando de Souza Teles, Paula Mantovani dos Santos, Ademar Wong and Maria D. P. T. Sotomayor\*

5914

**Prediction of photocatalytic performance of  $\text{TiO}_2$  hybrid catalysts based on the nature of the ligand: a simple theoretical model as a guide for advanced materials**

Giuseppe Santoriello, Claudio Imparato,\* Ida Ritacco, Aurelio Bifulco, Paola Amato, Gerardino D'Errico, Antonio Aronne, Matteo Farnesi Camellone, Fabia Grisi and Lucia Caporaso\*

5928

**Efficient dual-phase visual detection of pesticides in real samples with electron-rich emitters carrying multiple twists**

Shivani Tripathi and Manab Chakravarty\*

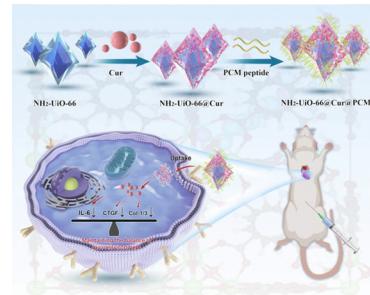


## PAPERS

5940

## Biomineralized metal–organic frameworks targeting collagen for suppression of myocardial fibrosis and enhancement of cardiac function

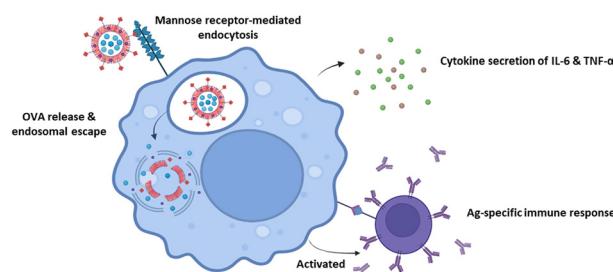
Jiao Liu, Xueli Zhao, Bo Wang, Ruoxuan Li, Yuze Qin, Yue Wang, Jia Zhao, Lanlan Zhang, Liang Yu\* and Liwen Liu\*



5948

## Mannose-decorated polymersomes loaded with antigens and TLR7/8 agonists targeting antigen-presenting cells for enhancing vaccine efficacy

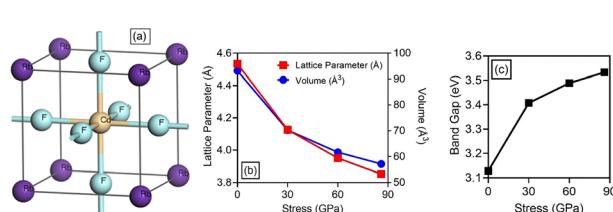
Jong-Woo Lim, So-Eun Lee, Hongjun Park, Sojeong Lee, Minjoo Yeom, Seungjoo Haam\* and Daesub Song\*



5959

## A DFT study to evaluate the modulation in the band gap, elastic, and optical performances of $\text{RbCdF}_3$ under the influence of stress

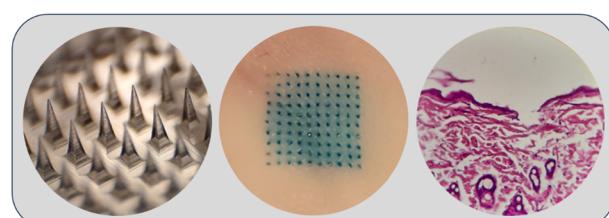
M. Sana Ullah Sahar, S. M. Junaid Zaidi, Hammad Khalid and M. Ijaz Khan\*



5971

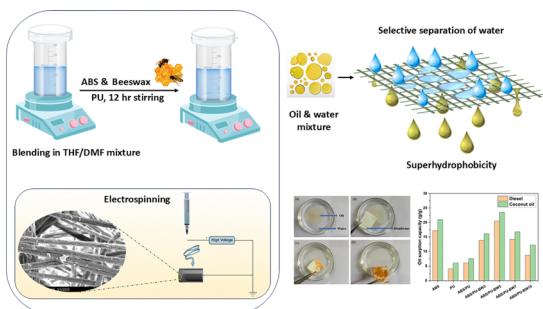
## Localized photothermal–chemotherapy synergy via $\text{Bi}_2\text{S}_3$ and sorafenib co-loaded dissolvable micro-needles: a non-invasive precision delivery approach for melanoma suppression

Mahsa Akbari, Maryam Toolabi, Atefeh Malek-Khatabi, Mohammad Reza Eskandari, Bo Zhi Chen, Xin Dong Guo and Mohammad-Ali Shahbazi\*



## PAPERS

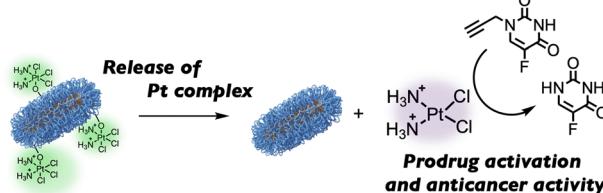
5991



## Beeswax-modified super hydrophobic acrylonitrile butadiene styrene/polyurethane electrospun membrane for effective oil–water separation

Muhammed Shabeer, Maria Mathew, Manaf Olongal and Sujith Athianathil\*

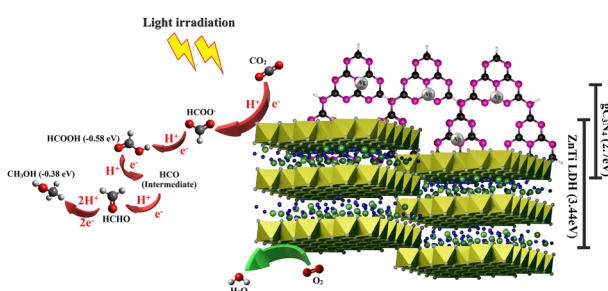
6001



## Platinum catalyst-functionalized cylindrical graft copolymer micelles for dual catalytic and cytotoxic activity

Kyosuke Seryu, Chieri Inada and Tomoki Nishimura\*

6008



## Synergistic effects of Ag/g-C<sub>3</sub>N<sub>4</sub>-incorporated bi-metallic ZnTi-LDH in CO<sub>2</sub> photoreduction to hydrocarbons

Jijoe Samuel Prabagar, C. Ashajyothi, Arpan Kumar Tripathi, Peter R. Makgware, Akhtar Rasool, Mohammed H Alqarni, Ahmed I. Foudah, Dong-Kwon Lim and Harikaranahalli Puttaiah Shivaraju\*

6022



## A 3-in-1 multifunctional porous organic polyimide: detection, capture and controlled release of antibacterial drugs

Rasha Diab, Fatima Mahroos, Sreeshna Ravindran, Oussama M. El-Kadri\* and Mohammad H. Al-Sayah\*

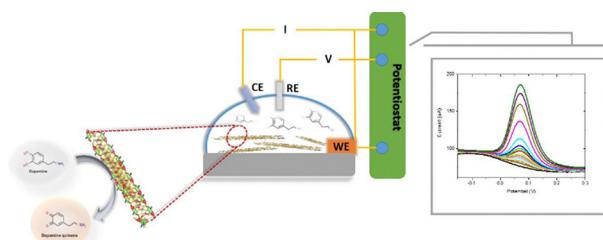


## PAPERS

6038

**Advanced 2D MoS<sub>2</sub>–chitosan nanocomposites for ultra-sensitive and selective dopamine detection**

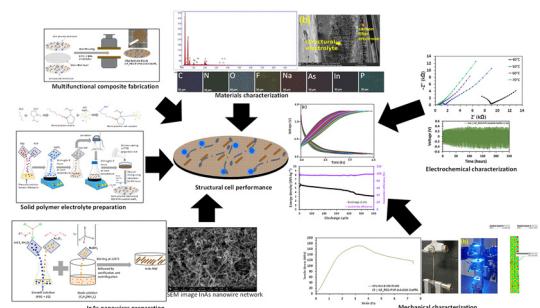
Ratiba Wali, Rayhane Zribi,\* Viviana Bressi, Ramzi Maalej, Antonino Foti, Pietro Giuseppe Gucciardi, Wissem Cheikhrouhou-Koubaa and Giovanni Neri



6052

**Fabrication and characterization of high-tensile-strength PEO–PVP blend-based multifunctional composites for sodium-ion structural batteries**

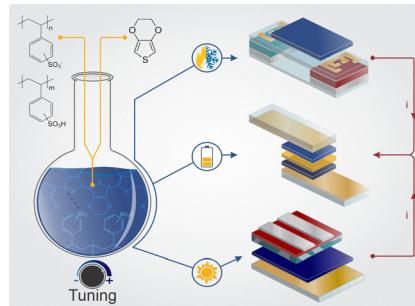
Vasan Iyer,\* Sandeep Kumar, Håkan Pettersson, Jan Petersen, Sebastian Geier and Peter Wierach



6066

**Synthesis engineering and development of emergent conducting pi-conjugated materials: applications in energy harvesting and storage devices**

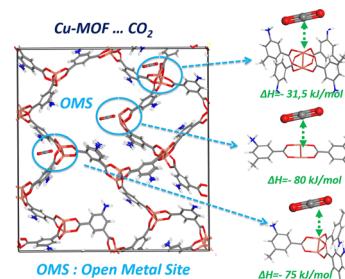
Germán D. Gómez Higuita,\* João H. C. Bocchi, Yosthyn M. Ariza Florez, Gustavo G. Dalkiranis, Bianca de Andrade Feitosa, Diego Sousa, Sara Luiza Gusso, Marcos Luginieski, João Vitor de Lima, Rafael F. Santiago de Souza and Gregório Couto Faria\*



6076

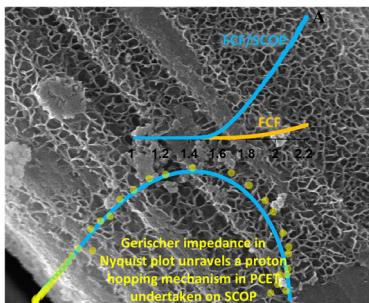
**Synthesis optimization, adsorption properties and spectroscopic investigation of an NH<sub>2</sub>-tagged Cu-based MOF with open metal sites**

Lotfi Boudjema, Anil Kumar Dahiya, Ivan da Silva, Diego Gianolio, Izuchika Nduka, Manfred Erwin Schuster, Gea Theodora van de Kerkhof, Paulina Kalinowska, Emilio Borrego-Marin, Jorge A. R. Navarro, Valentina Colombo, June McCorquodale, David C. Grinter, Pilar Ferrer, Georg Held, C. Richard A. Catlow and Rosa Arrigo\*

*Mapping Sorption Energetics at OMS*

## PAPERS

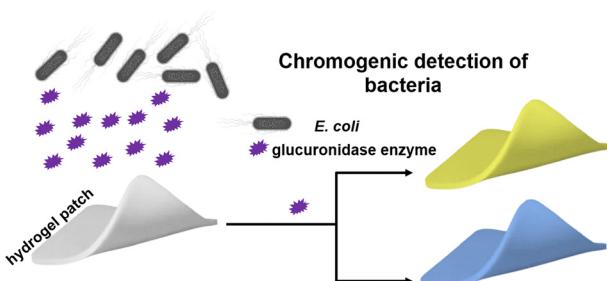
6094



**3D honeycomb porous sulfonated covalent organic polymer (PCOP) synthesized on carbon fabric at refrigerated temperature: supercapacitor and metal-free proton relay for water oxidation in alkaline and neutral media**

Roghayeh Azizi, Mojtaba Shamsipur,\* Avat (Arman) Taherpour, Maryam Miri and Afshin Pashabadi\*

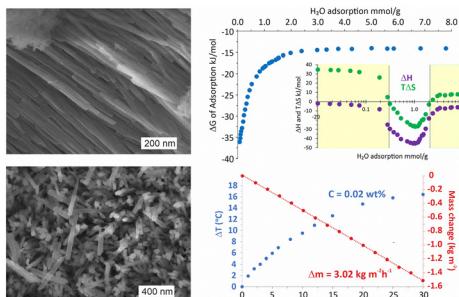
6109



**Dye-integrated photocrosslinkable polymers and networks for the visual chromogenic detection of a bacterial enzyme**

Muhammad Atif, Gizem Babuç, Martijn Riool, Sebastian A. J. Zaai and Ulrich Jonas\*

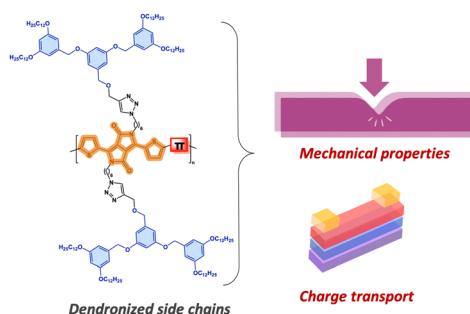
6122



**Deciphering the mechanism of water interaction with nanostructural copper oxide: going beyond superwetting**

Julia Moszczyńska, Xinying Liu, Yali Yao and Marek Wiśniewski\*

6130



**Side-chain engineering of semiconducting polymers with poly(benzyl ether) dendrons: impact on electronic and mechanical properties**

Gage T. Mason, Chloé Lisowski, Piumi Kulatunga, Tiago C. Gomes, Angela Awada, Yu-Xin Hsu, Yu-Cheng Chiu and Simon Rondeau-Gagné\*

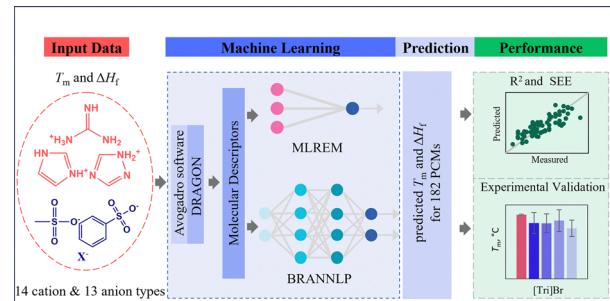


## PAPERS

6140

## Machine learning-based predictions of melting temperature and enthalpy of fusion for protic organic salt phase change materials

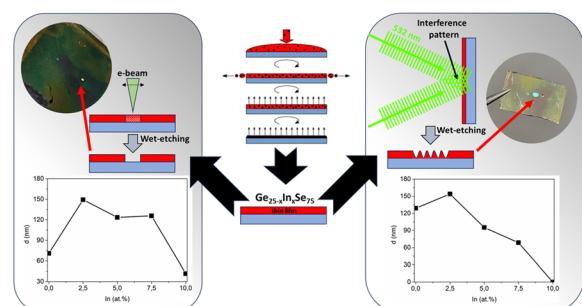
Saliha Saher, Tu C. Le,\* Tamar L. Greaves, Jennifer M. Pringle, Douglas R. MacFarlane and Karolina Matuszek\*



6152

## Spin-coated Ge–In–Se thin films: characterization and changes induced by visible and electron radiation in relation to indium content

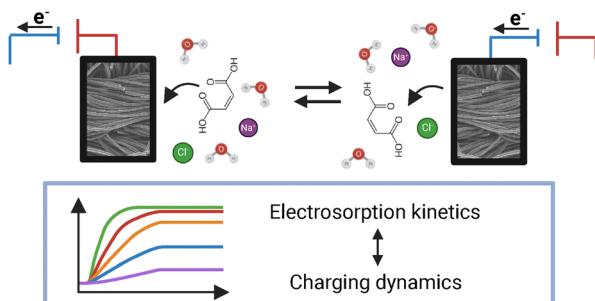
Jiri Jancalek, Aidan Milam, Stanislav Slang,\* Michal Kurka, Roman Svoboda, Jiri Jemelka, Miroslav Vlcek and Karel Palka



6162

## Activated carbon cloth as efficient microporous electrode for maleic acid recovery through electrical potential

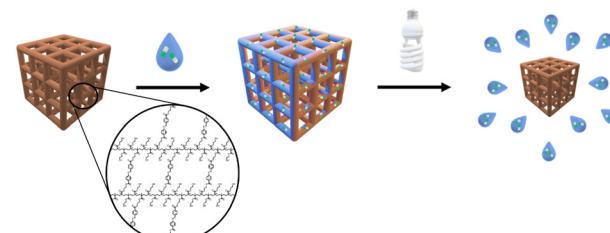
Dennis Röcker, Fabian Biebl, Lisa Meier, Sebastian Patrick Schwaminger, Paula Fraga-García\* and Sonja Berensmeier\*



6174

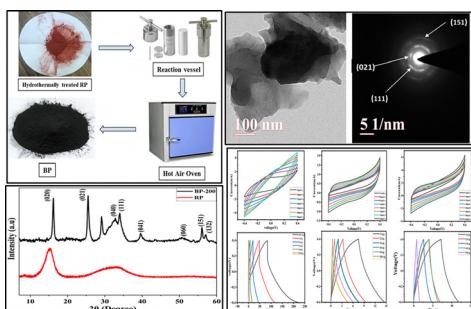
## 4D printed polymethacrylate lattices capable of dimensional switching and payload release via photoresponsive actuation of azobenzene units

James MacKay, Lewis R. Hart, Alarqam Z. Tareq, Simeng Wang, Valeria Gonzalez Abrego, Ian Maskery, Derek Irvine, Ricky D. Wildman and Wayne Hayes\*



## PAPERS

6183

**Enhanced energy storage properties of red phosphorus/black phosphorus hybrid nanostructures**

Shahbaz Ahmad and Mohd Zubair Ansari\*

