

# Materials Advances

An open access journal publishing across the breadth of materials science

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## IN THIS ISSUE

ISSN 2633-5409 CODEN MAADC9 4(19) 4261–4622 (2023)



### Cover

See Yubao Li, Qin Zou *et al.*, pp. 4349–4368. Image reproduced by permission of Qin Zou & Rui Zhang from *Mater. Adv.*, 2023, 4, 4349.



### Inside cover

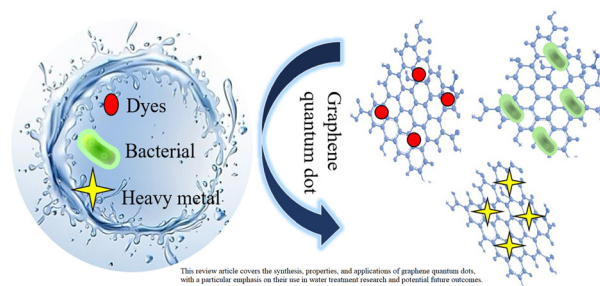
See Takashi Yanagishita *et al.*, pp. 4369–4376. Image reproduced by permission of Takashi Yanagishita from *Mater. Adv.*, 2023, 4, 4369.

## REVIEWS

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### Graphene quantum dots: synthesis, characterization, and application in wastewater treatment: a review

Peyman Gozali Balkanloo,  
Kolsum Mohammad Sharifi and  
Ahmad Poursattar Marjani\*

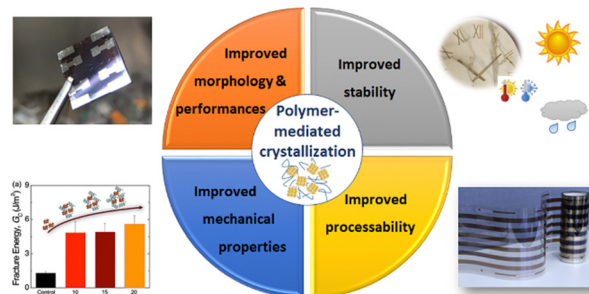


This review article covers the synthesis, properties, and applications of graphene quantum dots, with a particular emphasis on their use in water treatment research and potential future outcomes.

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### Incorporation of functional polymers into metal halide perovskite thin-films: from interactions in solution to crystallization

Antonella Giuri,\* Nadir Vanni, Muneeza Ahmad,  
Nicholas Rolston, Carola Esposito Corcione,  
Andrea Listorti, Silvia Colella and Aurora Rizzo\*



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## PERSPECTIVES

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**MXene-based wearable supercapacitors and their transformative impact on healthcare**

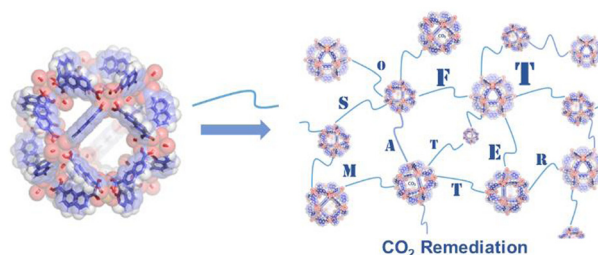
Siavash Iravani\* and Rajender S. Varma



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**Connecting metal–organic cages (MOCs) for CO<sub>2</sub> remediation**

Javier Martí-Rujas

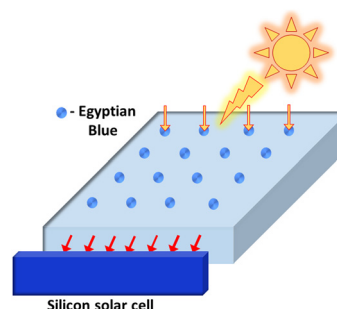


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**Eco-friendly Egyptian blue (CaCuSi<sub>4</sub>O<sub>10</sub>) dye for luminescent solar concentrator applications**

Tharmakularasa Rajaramanan, Mansoureh Keykhaei, Fatemeh Heidari Gourji, Punniamoorthy Ravirajan, Meena Senthilnathanan, Øyvind Frette and Dhayalan Velauthapillai\*

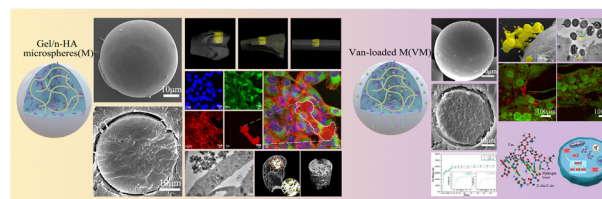


## PAPERS

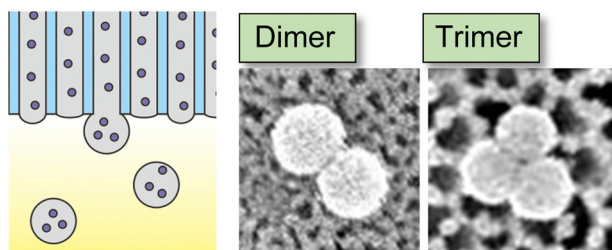
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**Injectable gelatin microspheres for osteomyelitis treatment: osteogenic and anti-inflammatory effect**

Rui Zhang, Li Chen, Yijing Stehle, Mingyue Lin, Chenxin Wang, Yufan Li, Min Huang, Yubao Li\* and Qin Zou\*



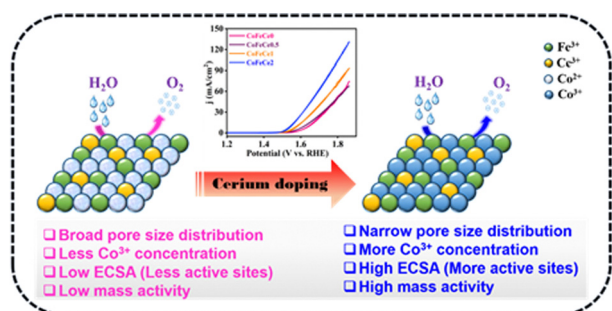
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### Fabrication of nanoparticle assemblies with a controlled number of constituent nanoparticles by membrane emulsification using anodic porous alumina

Takashi Yanagishita,\* Kantaro Yuda, Toshiaki Kondo and Hideki Masuda

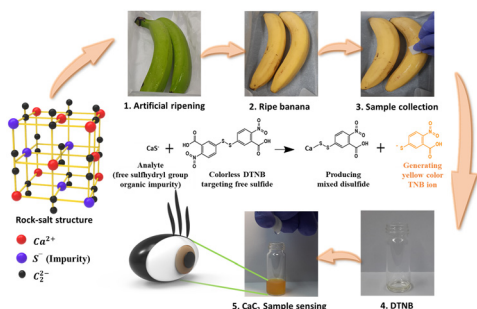
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### Pore size and electronic tuning in cerium-doped CoFe-LDH for the oxygen evolution reaction

Parul Aggarwal, Bhupendra Singh and Amit Paul\*

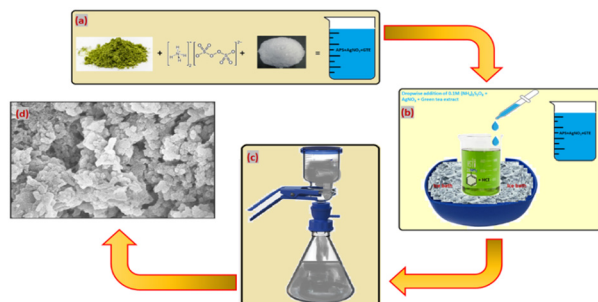
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### Colorimetric sensing of calcium carbide over banana peels using 5,5'-dithiobis-(2-nitrobenzoic acid) (DTNB) as a rapid chemoreceptor: a point of care tool for food fraud analysis

Sonam Sonwal, Shruti Shukla,\* Munirah Alhammadi, Reddicherla Umapathi, Hemanth P. K. Sudhani, Youngjin Cho\* and Yun Suk Huh\*

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### Nanoclay-based conductive and electromagnetic interference shielding properties of silver-decorated polyaniline and its nanocomposites

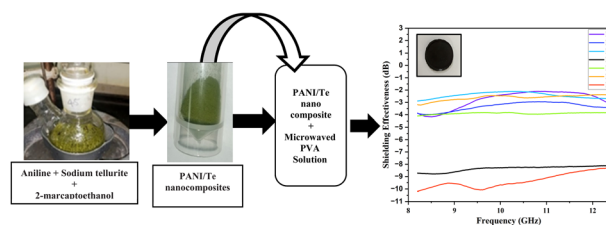
Revanasiddappa Moolemane,\* Haridasa Nayak, Naveen Marudhachalam, Anantha Krishnan Coimbatore Venkatasubramanian, Anirudh Raj Arunachalam Chandra, Arun Murugappan Iyyappan and Suresh Babu Naidu Krishna\*



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### Novel synthesis of polyaniline/tellurium (PANI/Te) nanocomposite and its EMI shielding behavior

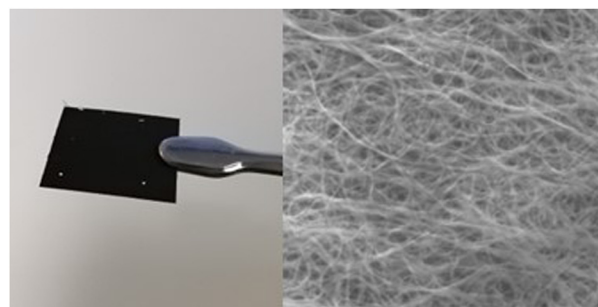
Alok Kumar Yadav, Naeem Mohammad and Pawan K. Khanna\*



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### Hierarchical porous-structured self-standing carbon nanotube electrode for high-power lithium–oxygen batteries

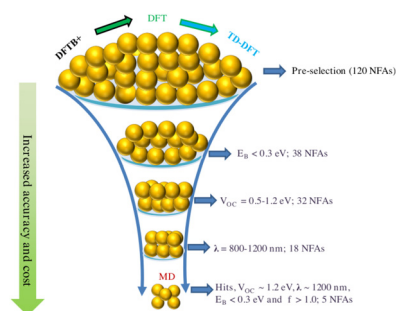
Jitraporn Saengkaew, Takashi Kameda and Shoichi Matsuda\*



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### Design and screening of B–N functionalized non-fullerene acceptors for organic solar cells via multiscale computation

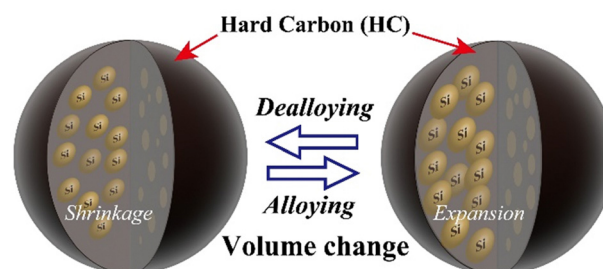
Rudranarayan Khatua and Anirban Mondal\*



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### Degradation suppression effect of amorphous-hard-carbon-bundled Si-based negative electrode

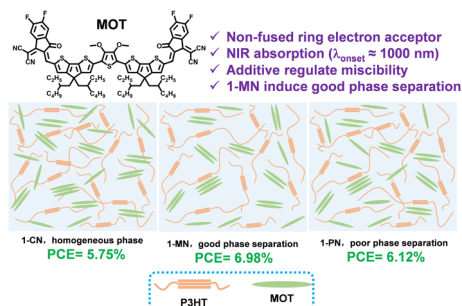
Uran Tsunoda, Koji Hiraoka, Yoshikazu Kobayashi, Takao Kunimi and Shiro Seki\*





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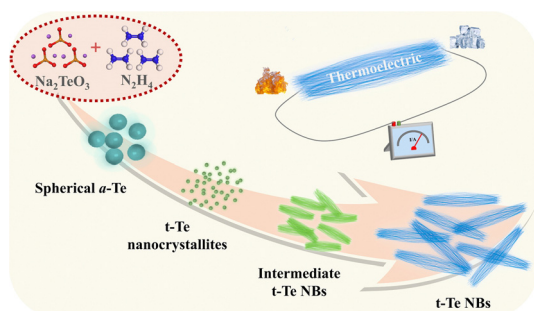
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### Additive engineering for high-performance P3HT:non-fused ring electron acceptor organic solar cell

Dou Luo, Lanqing Li, Erjun Zhou, Wai-Yeung Wong and Aung Ko Ko Kyaw\*

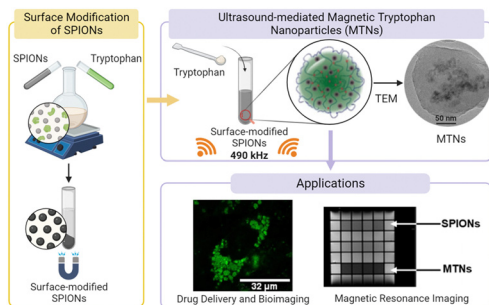
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### A systematic study on synthesis parameters and thermoelectric properties of tellurium nanowire bundles

Yanmei Ren, Rongke Sun, Xue Yu, Ruoxi Wang, Wusheng Zhang, Xiaodong Zhu, Yanqing Ma\* and Lei Ma\*

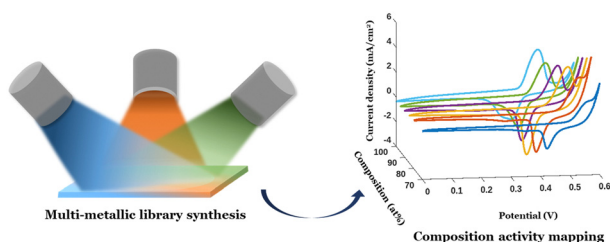
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### Ultrasound-driven fabrication of hybrid magnetic tryptophan nanoparticles

Anshul Baral, Haiyan Zhu, Bradford A. Moffat, Santanu Chattopadhyay, Francesca Cavalieri\* and Muthupandian Ashokkumar\*

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### Exploration of a NiFeV multi-metal compositional space for the oxygen evolution reaction

Anagha Usha Vijayakumar, Jael George Mathew, Anya Muzikansky, Hannah-Noa Barad\* and David Zitoun\*

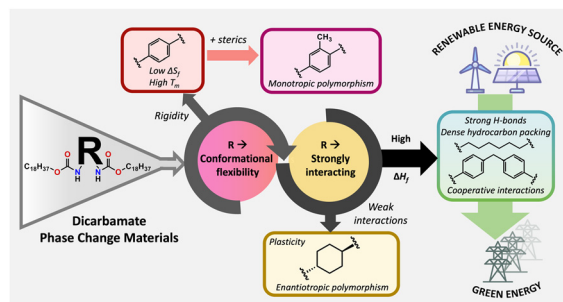


## PAPERS

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# Probing crystal structures of dicarbamate phase change materials to inform structural design

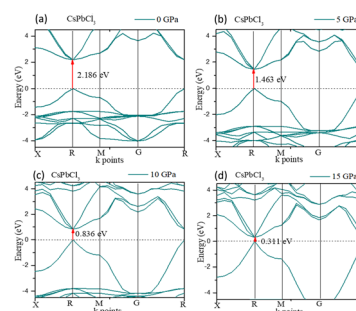
Samantha L. Piper, Craig M. Forsyth, Mega Kar, Luke A. O'Dell, Jisheng Ma, Jennifer M. Pringle, Douglas R. MacFarlane and Karolina Matuszek\*



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# Pressure-dependent comparative study of the mechanical, electronic, and optical properties of $\text{CsPbX}_3$ ( $\text{X} = \text{Cl}, \text{Br}, \text{I}$ ): a DFT study for optoelectronic applications

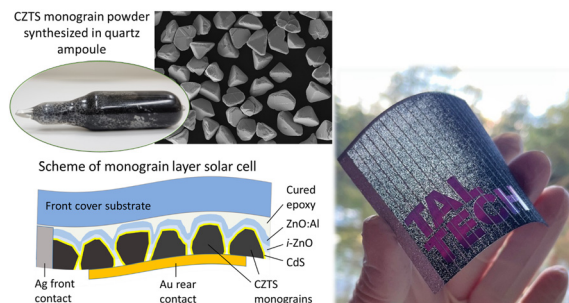
M. Aktary,\* M. Kamruzzaman\* and R. Afrose



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# Influence of alkali iodide fluxes on $\text{Cu}_2\text{ZnSnS}_4$ monograin powder properties and performance of solar cells

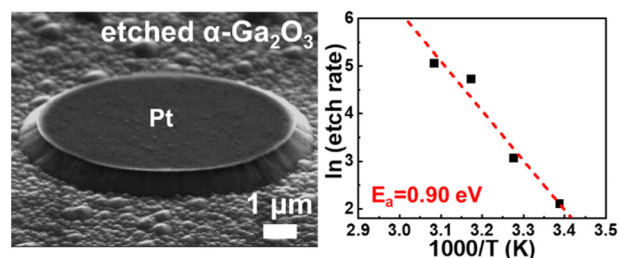
Kristi Timmo,\* Maris Pilvet, Katri Muska, Mare Altosaar, Valdek Mikli, Reelika Kaupmees, Raavo Josepson, Jüri Krustok, Maarja Grossberg-Kuusk and Marit Kauk-Kuusik



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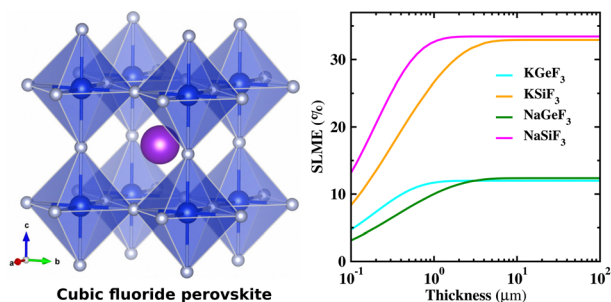
# Photo-enhanced metal-assisted chemical etching of $\alpha$ -gallium oxide grown by halide vapor-phase epitaxy on a sapphire substrate and its applications

Woong Choi, Dae-Woo Jeon, Ji-Hyeon Park, Dongryul Lee, Soobeen Lee, Kwang Hyeon Baik and Jihyun Kim\*



## PAPERS

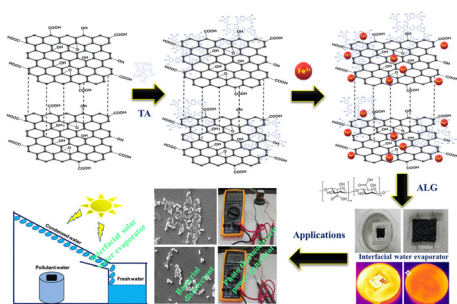
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### First-principles study on the optoelectronic and mechanical properties of all-inorganic lead-free fluoride perovskites $\text{ABF}_3$ (A = Na, K and B = Si, Ge)

Chol-Jin Pak, Un-Gi Jong,\* Chung-Jin Kang, Yun-Sim Kim, Yun-Hyok Kye and Chol-Jun Yu\*

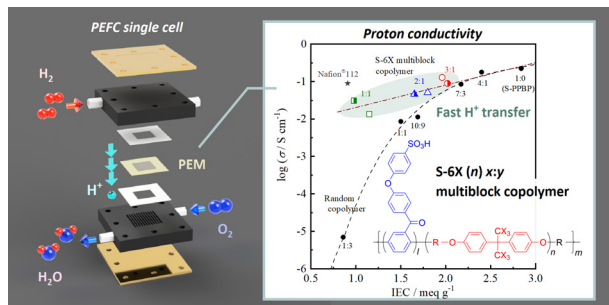
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### A Multifunctional tannic acid- $\text{Fe}^{3+}$ -graphene oxide loaded alginate photothermal network: an interfacial water evaporator, a disinfectant and a power generator

M. Amarnath, Hirakendu Basu,\* Ranita Basu, Pallavi Chandwadkar, Celin Acharya, Shweta Singh, Suresh Kumar Kailasa and Chandra Nath Patra

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### Multiblock-copolymerisation-derived sulfonated-poly(p-phenylene)-based polymer electrolyte membranes with simultaneously enhanced proton conductivity and mechanical strength

Miru Yoshida-Hirahara, Masahiro Yoshizawa-Fujita, Yuko Takeoka and Masahiro Rikukawa\*

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### Synthesis and photophysical properties of (post-)functionalized BOAHY dyes with strong aggregation-induced emission

Jonathan B. F. Vandenwijngaerden, Jianjun Huang, Charlotte Cresens, Wim Dehaen, Luc Van Meervelt, Susana Rocha, Mark Van der Auweraer and Eduard Fron\*



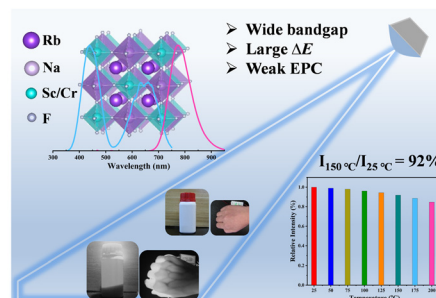


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### Near-infrared luminescence and high thermal stability of $\text{Rb}_2\text{NaScF}_6\text{:Cr}^{3+}$ phosphor for spectroscopy applications

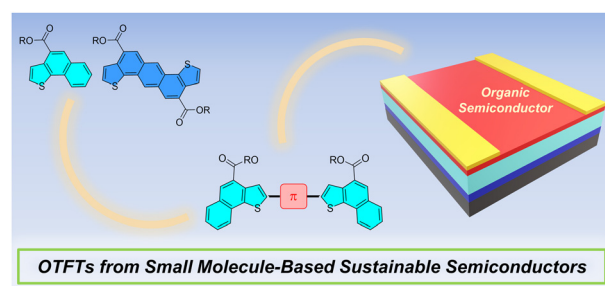
Lingxiang Chu, Yi Qin, Tao Yang, Jing Wan, Qiang Zhou,\* Huaijun Tang, Yanqing Ye and Zhengliang Wang\*



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### Solution-processable thin-film transistors from anthradithiophene (ADT) and naphthothiophene (NT) small molecule-based p-type organic semiconductors

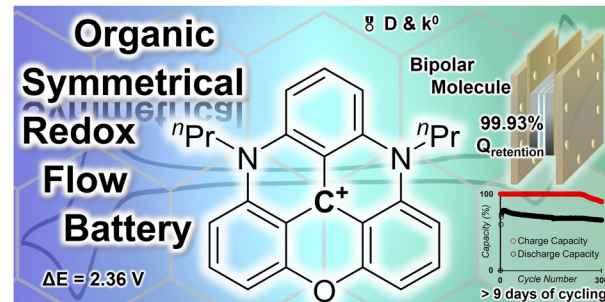
Andrea Nitti, Mattia Scagliotti, Luca Beverina, Luigi Mariucci, Matteo Rapisarda\* and Dario Pasini\*



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### Planar carbenium ions for robust symmetrical all organic redox flow batteries

Jules Moutet, Marko H. Nowack, David D. Mills, Diego L. Lozier, Bo W. Laursen and Thomas L. Gianetti\*



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### Cavity structured S-NiO with improved energy density for aqueous asymmetric hybrid supercapacitors by CDA mechanism

Pratik Ashok Patil, Suraj Anandrao Khalate, Umakant Mahadev Patil, Rajendra Devidas Kale and Sachin Babasaheb Kulkarni\*

