

# Materials Advances

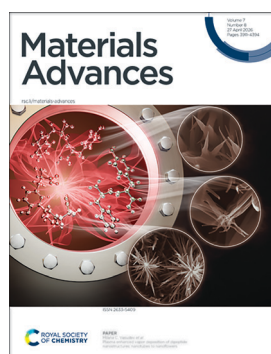
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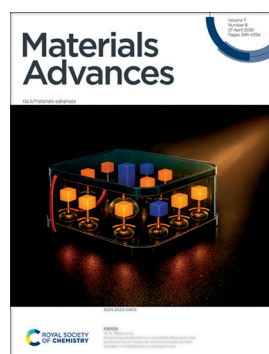
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ISSN 2633-5409 CODEN MAADC9 7(8) 3911-4394 (2026)



### Cover

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### Inside cover

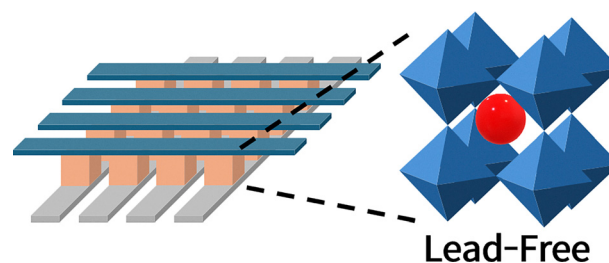
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## HIGHLIGHT

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### AI enabled lead-free halide perovskite memristor crossbar arrays for energy efficient in-memory computing

Hyojung Kim

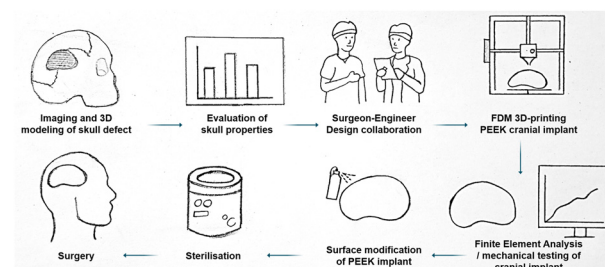


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### PEEK implants for cranioplasty: a mapping review of 3D printing, surface functionalisation, and clinical performance gaps

Zoltán Márk Horváth, Roman Viter, Oskars Radziņš, Andreas Thor, Tetiana Kolisnyk\* and Valentyn Mohylyuk\*



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## REVIEWS

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### Metallenes: synthesis, properties, and applications in electrocatalysis and energy storage

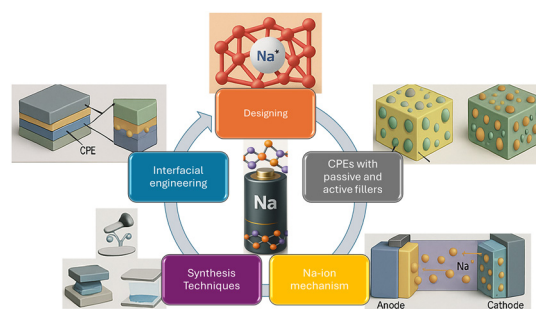
E. S. Sowbakiyavathi, Aakash Carthick Radjendirane, Ju Hyun Oh, Seung Jun Lee\* and Subramania Angaiah\*



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### Composite polymer electrolytes for sodium-ion batteries: from material design to interfacial engineering and future perspectives

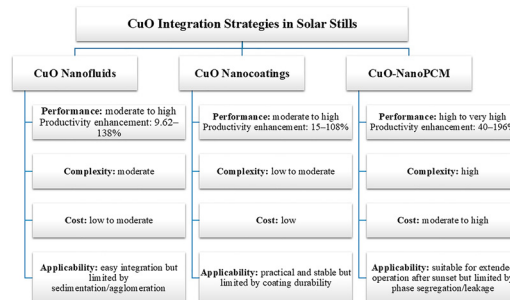
Muhammad Irfan, Khizar Hayat Khan,\* Afzal Shah and Hazrat Hussain\*



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### The role of copper oxide nanomaterials in solar desalination: a systematic review of integration strategies

A. S. Abdullah, Abanob Joseph, Wissam H. Alawee,\* Mohamed Elashmawy, Mohammed El Hadi Attia, Swellam W. Sharshir and Ahmed El-Harairy\*

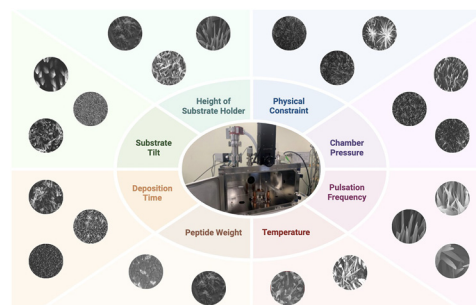


## PAPERS

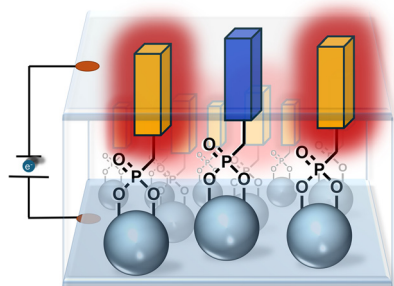
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### Plasma enhanced vapor deposition of dipeptide nanostructures: nanotubes to nanoflowers

Jordan Pagliuca, Prathyushakrishna Macha, Marilyn Naeem and Milana C. Vasudev\*



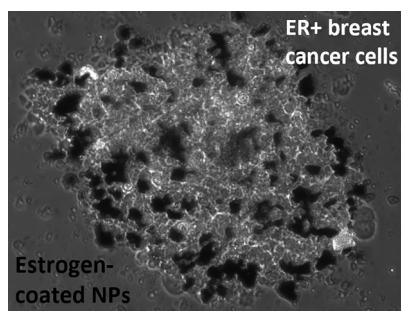
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### Enhancing electrochromic and electrofluorochromic performance of molecular electrochromes by their covalent immobilization to nanoparticles

Mohan Raj Anthony Raj, Sacha Porlier, Ram Restikian and W. G. Skene\*

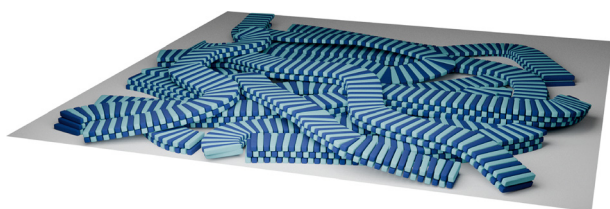
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### Hormone-coated nanocontrast agent promotes ER+ breast cancer cell detection

Ankan Biswas and Manos Gkikas\*

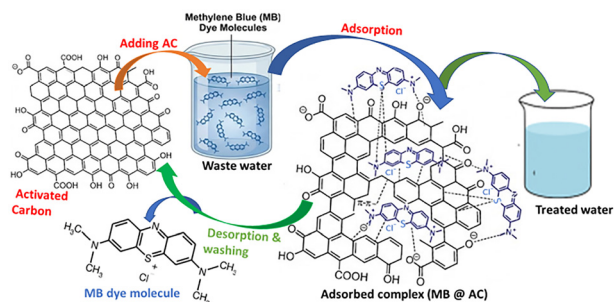
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### Nanoparticle-based superchain networks formed by the side-by-side self-assembly of soft magnetite nanorods

Madeleine Alexandra Schaefer, Sebastian Polarz and Irene Morales\*

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### Highly efficient and selective *Maerua subcordata* tuber-derived activated carbons for enhanced removal of methylene blue from wastewater samples

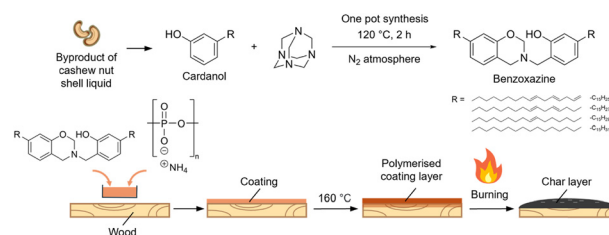
Addis Mekonnen Woldehana, Amare Aregahegn Dubale,\* Andualem Mekonnen Hiruy and Muzammil Anjum



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### Cardanol-based benzoxazine and its potential with ammonium polyphosphate in flame-retardant coatings

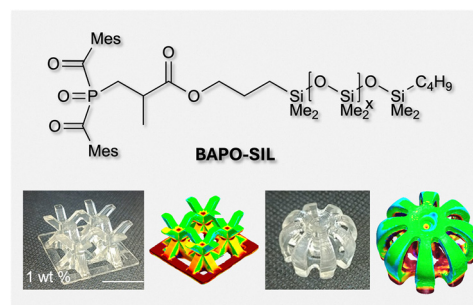
Heng Jun Huei, Wang Jiali, Yen Zhihao, Xiao Xingchi, Ahmad Hedzir Fahmi bin Mohd Kamdi, Rui A. Gonçalves and Leonard Ng Wei Tat\*



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### Solvent-free 3D printing of silicone elastomers by digital light processing using an oligosiloxanyl substituted bis(acyl)phosphane oxide as photoinitiator

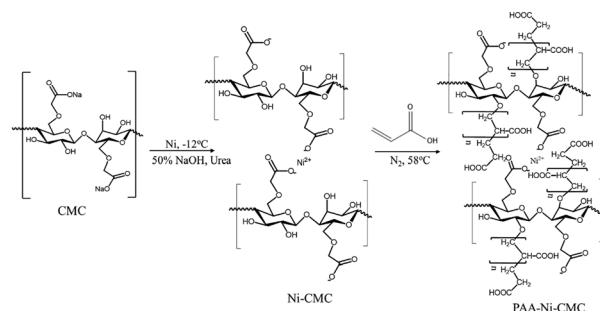
Debora Eiler, Enzo Brack, Yulia Yuts, Desirée Baruffaldi, Francesca Frascella, Andrea Cosola, Xun Sun, Annalisa Chiappone,\* Yinyin Bao\* and Hansjörg Grützmacher\*



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### Fabrication of multifunctional poly(acrylic acid) hydrogels using a nickel–carboxymethyl cellulose crosslinker

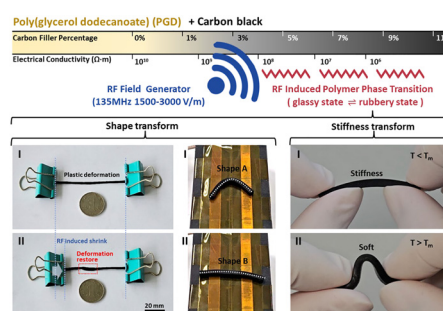
Md. Sohanur Rahman, Maisha Rahman, Md. Mahamudul Hasan Rumon, Chanchal Kumar Roy and Md. Mahub Alam\*



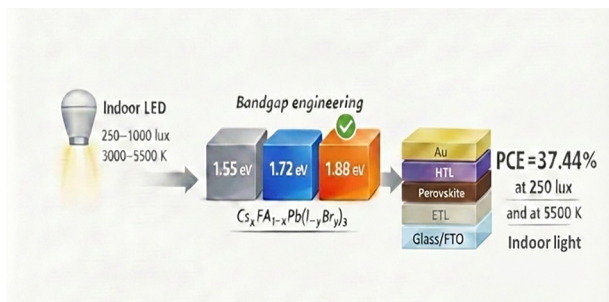
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### A novel radiofrequency-induced phase-transition strategy for shape and stiffness switching in poly(glycerol dodecanoate) polymers

Kaixiang Jin,\* Xiaomei Wu, Sheng Hu, Dajing Wu, Ran Guo, Zhichao Wang and Yunxiao Liang



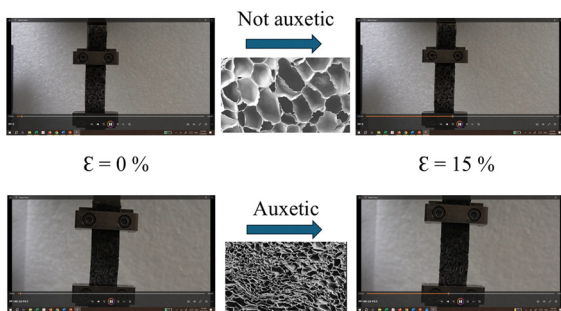
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### Bandgap engineering for efficient perovskite solar cells under multiple color temperature indoor lighting

Miqad S. Albishi, Faisal I. Alabdulkarem, George Perrakis, Tariq F. Alhuwaymel, Ala H. Sabeeh, Abdullah S. Alharbi, Naif R. Alshamrani, Ibrahim H. Khawaji, Nikolaos Tzoganakis, Majed M. Aljomah, Dimitris Tsikritzis, Sami A. Alhusaini, Abdullah Aljalalah, Kadi S. AlShebl, Ali Alanzi, Abrar Bin Ajaj, Fay M. Alotaibi, Hamad Albrithen, Konstantinos Petridis, Maria Kafesaki, Emmanuel Kymakis, George Kakavelakis\* and Essa A. Alharbi\*

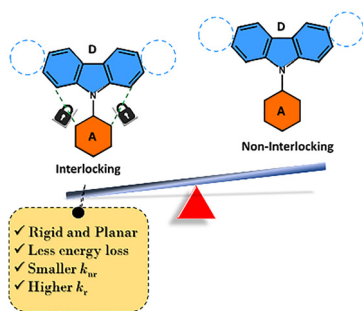
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### Auxetic polypropylene foams as high mechanical performance materials

Xiao Yuan Chen and Denis Rodrigue\*

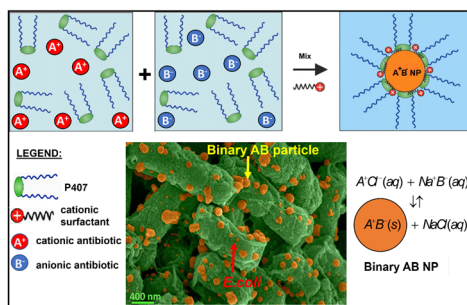
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### Rigidifying donor–acceptor frameworks via C–C interlocking to modulate excited-state dynamics in HLCT emitters

L. N. S. Laya Pagadala, Sivakumar Vaidyanathan and Mahesh Kumar Rawva\*

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### Surface functionalized binary antibiotic nanoparticles of enhanced antimicrobial action

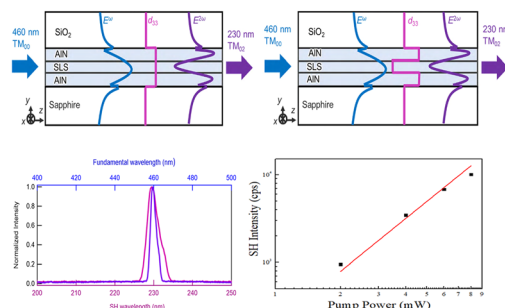
Nuriya Nurlankyzy, Yersin Kalmagambet, Arailym Kadir, Amro K. F. Dyab and Vesselin N. Paunov\*



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### Piezoelectrically-enhanced 230 nm far-UV second harmonic generation in a polarity-inversion-free AlN/AlGaN strained-layer superlattice channel waveguide

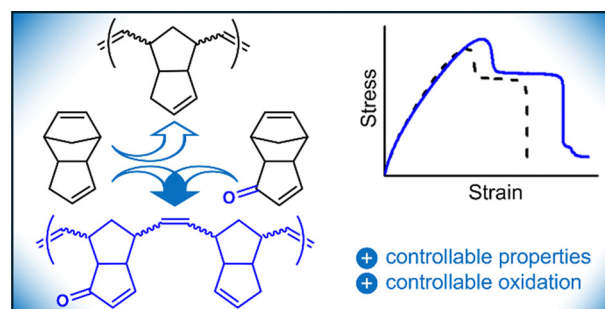
Shahzeb Malik,\* Ryo Momosaki, Hiroto Honda, Kanako Shojiki, Hideto Miyake, Masahiro Uemukai, Tomoyuki Tanikawa\* and Ryuji Katayama



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### Tuning the mechanical performance of polydicyclopentadiene copolymers through dicyclopentadienone monomer incorporation

Benjamin Godwin,\* Adam Sylvain-Stewart and Jeremy E. Wulff\*

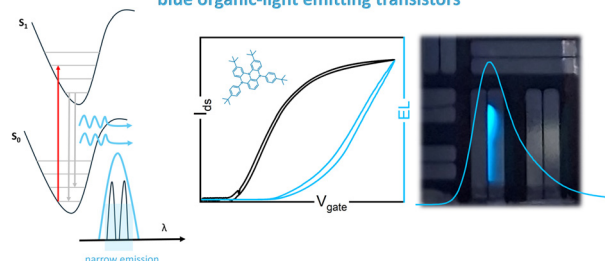


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### Multi-resonant thermally-activated delayed fluorescence (MR-TADF) emitters for blue organic light-emitting transistors (OLETs)

Georgios Fanourakis,\* Amirhossein Azari and Caterina Soldano\*

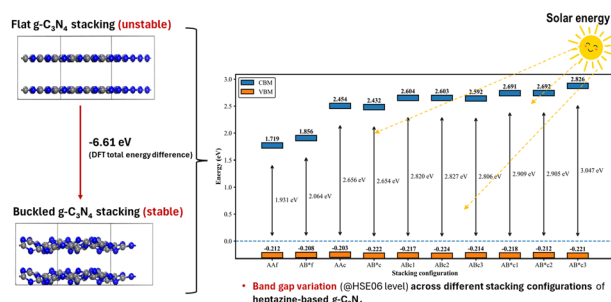
#### Multi-resonant thermally-activated delayed fluorescence (MR-TADF) blue organic-light emitting transistors



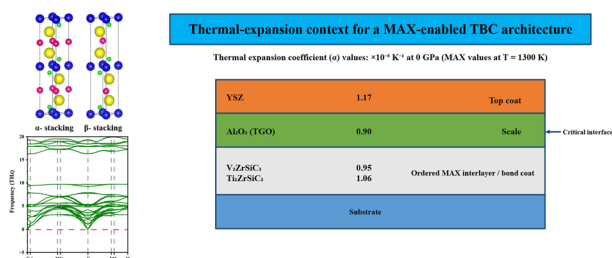
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### Reassessing structural models of graphitic carbon nitride for reliable photocatalytic predictions

Gbemi F. Abass, Adnan Ahmad, Cheng Yang, Yun Liu\* and Terry J. Frankcombe\*



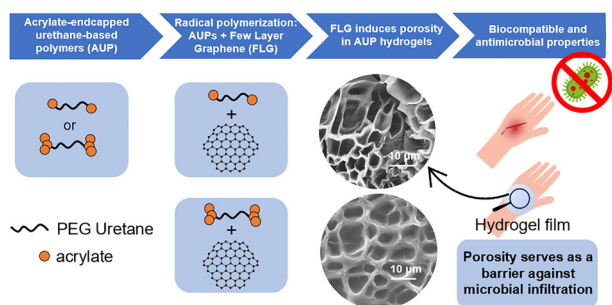
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 $V_2ZrSiC_2$  /  $Ti_2ZrSiC_2$ 

### Computational assessment of structural, mechanical, and thermal properties of ordered MAX phases $V_2ZrSiC_2$ and $Ti_2ZrSiC_2$ for high-temperature applications

Mohammed Traiche, Md. Nurul Amin,\*  
Ahmed Azzouz-Rached, M. A. Ali, Tasneem Alayed,  
Aya M. Al-Zuheiri, Yazen M. Alawaideh, Abdulla Al Faysal  
and M. S. Alam

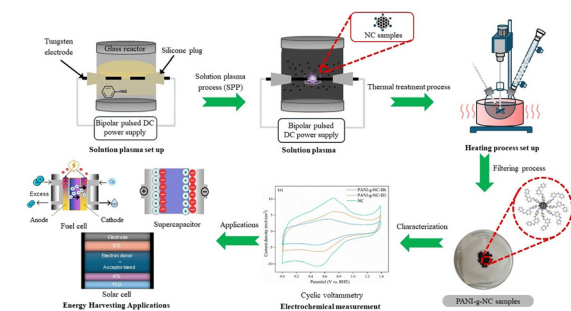
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### Graphene-assisted porosity in acrylate-encapped urethane-based hydrogels for biomedical applications

Josué M. Galindo,\* Nicolas Deroose,  
Beatriz García-Béjar, Lana Van Damme,  
María Arévalo-Villena, Sonia Merino, Ester Vázquez,  
M. Antonia Herrero\* and Peter Dubruel\*

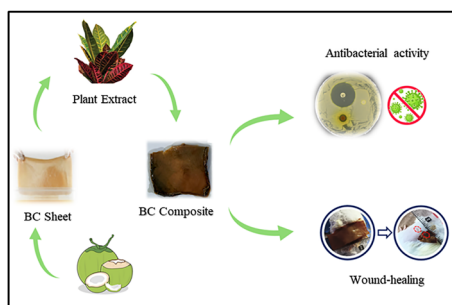
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### Design and fabrication of a polyaniline-grafted nanocarbon material for energy harvesting applications

Tien Hung Nguyen, Thanh Huy Nguyen,  
Bui Anh Duy Nguyen, Thi Cam Linh Tran,  
Thanh Tung Tran, Ngoc Phuong Thuy Tran,  
Thi My Linh Phan, Huu An Ho, Tri Hieu Pham,  
Tuan Anh Luu, Thi Quynh Anh Luong,  
Vu Uyen Nhi Nguyen and Quoc Phu Phan\*

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### Sustainable antibacterial and wound-healing hydrogels: *Croton confertus*-loaded bacterial cellulose composites

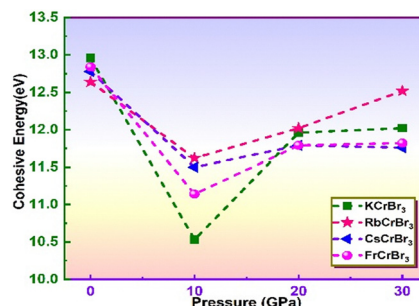
Mazhar Ul-Islam, Fatima Habis, Atiya Fatima,  
Abdullah Khamis Al Saidi, Adeb Shehzad, Fatima Koofan,  
Fay Almashli, Amira Ahmed Ali Kashoob,  
Muhammad Wajid Ullah, Shaukat Khan,\*  
Mustapha El Hariri El Nokab, Malek Ali\* and  
Khaled O. Sebakhy\*



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### Computational evaluation of pressure effects on cubic ferromagnetic perovskites $\text{ACrBr}_3$ ( $A = \text{K}, \text{Rb}, \text{Cs}, \text{Fr}$ ): materials engineering perspectives for spintronics and optoelectronics *via* DFT

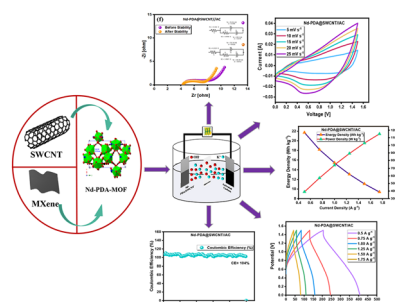
Basanti Banik, Mst. Shamima Khanom, Md. Rony Hossain\* and Farid Ahmed



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### Exploring synergistic effects of a neodymium-based metal organic framework with SWCNTs and MXene for hybrid energy storage devices

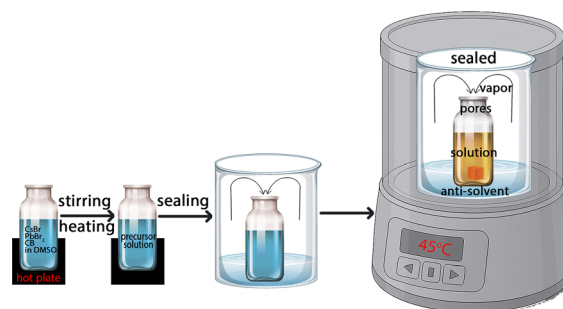
Muhammad Shahbaz, Shahzad Sharif,\* Sidra Farid, Muhamad Imran Din, Zaib Hussain, Khadija Nasir, Reana Tajamal, Soha Rafique, Ayoub Rashid Ch and Islam Ullah Khan



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### $\text{CsPbBr}_3$ crystal growth *via* antisolvent vapor assisted method and their photoelectric properties

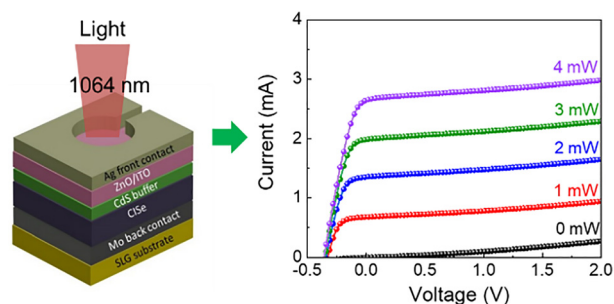
Maksym Pecherkin,\* Vasyly Mykhailovych,\* Matthias Gutmann, Gheorghe Lucian Pășcuț, Petro Fochuk,\* Mariia Mykhailovych, Aurelian Rotaru, Yuriy Khalavka and Andriy Dmytruk



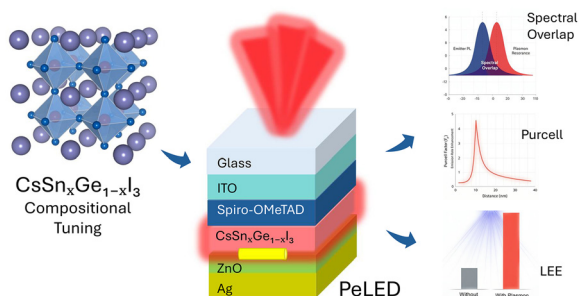
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### Ga back-graded $\text{CuInSe}_2$ thin films for high-performance near-infrared photodetectors

Temujin Enkhbat, Jieun Park, Sang Hun Lee, Seong Ju Park and Jae Hyung Jang\*



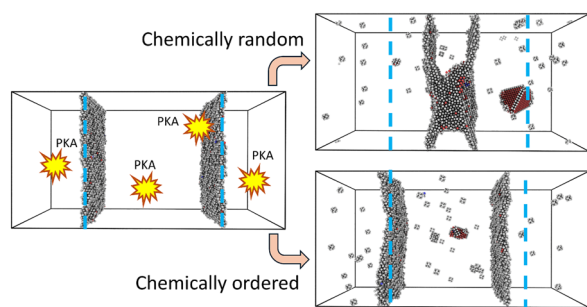
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### An integrated DFT–FDTD design of plasmon-enhanced lead-free $\text{CsSn}_x\text{Ge}_{1-x}\text{I}_3$ perovskite LEDs

Shoumik Debnath, Sudipta Saha, Khondokar Zahin, Ying Yin Tsui and Md Zahurul Islam\*

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### Local chemical order suppresses grain boundary migration under irradiation in CrCoNi

Ian Geiger, Penghui Cao and Timothy J. Rupert\*

