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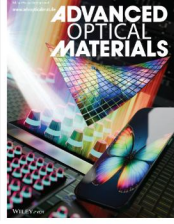
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Multi-Dielectric Metasurfaces for Ultrabright, Tunable Structural Color and Reconfigurable Optical Filtering with Extraordinarily Large Color Span (Advanced Optical Materials 23(2026))

Md Rumon Miah, Yavuz Selim Aydin, Hilmi Volkan Demir

e71257 | First Published: 19 June 2026

This article relates to:



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Structural Color Metasurfaces

The truncated-cone-shaped, multi-layered dielectric metasurfaces enable unprecedentedly saturated and bright structural colors, achieving record color gamut span. The proposed nanostructures lay a foundation for advanced digital displays and printing technologies. More details can be found in the Research Article by Hilmi Volkan Demir and co-workers (DOI: 10.1002/adom.71173).

Issue Information

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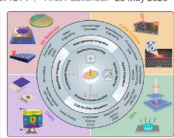
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REVIEW

Scalable Fabrication and On-Chip Integration of Single Photon Emitters

Zhicheng Su, Xinshuang Zhan, Zhaoyi Xue, Yuning Liang, Qingyuan Zuo, Changcheng Zheng, Zhenhua Ni, Junpeng Lu

e71314 | First Published: 28 May 2026

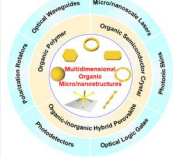


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Multidimensional Organic Photonic Micro/Nanostructures: From Precise Syntheses to Photonic Applications

Yinan Yao, Yuanchao Lv, Yong Sheng Zhao

e71319 | First Published: 28 May 2026



Multidimensional organic photonic micro/nanostructures have emerged as an exciting platform for developing next-generation nanophotonic devices with excellent photon manipulation capabilities. In this review, we outline the dimension control of organic photonic micro/nanostructures with high-level dimension morphologies to inspire more innovative research on this topic, including the design principles and strategies, and the state-of-the-art advances in diverse photonic applications. Moreover, the current challenges and corresponding potential avenues are also discussed.

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RESEARCH ARTICLE

Open Access

Multi-Dielectric Metasurfaces for Ultrabright, Tunable Structural Color and Reconfigurable Optical Filtering with Extraordinarily Large Color Span

Md Rumon Miah, Yavuz Selim Aydin, Hilmi Volkan Demir

e71173 | First Published: 30 March 2026

This article relates to:

Multi-Dielectric Metasurfaces for Ultrabright, Tunable Structural Color and Reconfigurable Optical Filtering with Extraordinarily Large Color Span

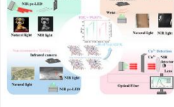
Structural color generation is an emerging field for digital display and printing applications. This report presents a novel truncated-cone design and the first use of GaP sandwiched between two layers of TiO₂, demonstrating ultra-bright, tunable colors with a record color gamut. Additionally, the same design serves as a reconfigurable filter by tailoring its geometry.

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Near-Unity Internal Quantum Efficiency in Na₃CaHf₂Ge₃O₁₂: Fe³⁺ Phosphors via Non-Stoichiometric Na⁺ Engineering

Yan Li, Xiangping Li, Jiani Luo, Yu Hao, Yichao Wang, Sai Xu, Hongquan Yu, Baoguo Chen

e00020 | First Published: 25 May 2026



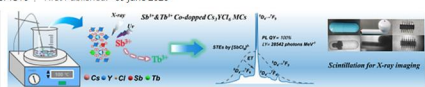
Herein, we propose a dual-functional non-stoichiometric Na⁺ engineering strategy for Na₃CaHf₂Ge₃O₁₂: Fe³⁺ (NCHGO: Fe³⁺) near-infrared (NIR) phosphors. Fe³⁺ preferentially occupies tetrahedral (Td) sites, emitting broadband NIR light centered at 770 nm. Excess Na⁺ acts as both a reactive flux (enhancing crystallinity) and a charge compensator (passivating oxygen vacancies) to suppress non-radiative recombination. The optimized NCHGO: Fe³⁺ phosphor achieves a near-unity internal quantum efficiency (IQE = 99.81%) and enhanced thermal stability (30.41% intensity retention at 423 K). Additionally, it enables selective Cu²⁺ detection via fluorescence quenching and exhibits stable performance in NIR phosphor-converted LEDs for night-vision imaging and non-destructive testing. This work establishes a generalizable defect-passivation pathway for high-performance multifunctional NIR phosphors.

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Green Aqueous Production of Lead-Free Cs₃YCl₆ Perovskite Microcrystals with Near-Unity Quantum Yield for High Performance X-ray Imaging

Qiming Huang, Zhentao Du, Jialiang Jiang, Hui Fu, Hui Peng, Jialong Zhao, Bingyao Zou, Weiyou Yang, Jinju Zheng

e71316 | First Published: 09 June 2026



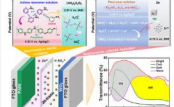
High-performance Sb³⁺/Tb³⁺ co-doped Cs₃YCl₆ microcrystals are synthesized via a scalable, green aqueous-phase evaporation method. Broadband absorption by Sb³⁺ enables efficient energy transfer to Tb³⁺, achieving near-unity PLQY and a light yield of 28 542 photons MeV⁻¹. These lead-free scintillators demonstrate excellent radiation stability and high spatial resolution for X-ray imaging applications.

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Potential Gradient-Driven Power-Free Films Fabrication Strategy for Electrochromic Window Achieving on-Demand Indoor Photothermal Regulation

Lijing Xiong, Yan Zhou, Pengfei Wang, Zheqi Wu, Jinmin Wang, Dongyun Ma

e03866 | First Published: 28 May 2026



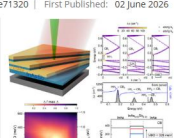
A power-free and scalable strategy is demonstrated for growing PANI and WO₃ films in a galvanic cell through potential-gradient-driven spontaneous reactions. A four-state electrochromic window is also presented by integrating Zn anode with the as-grown PANI and WO₃ electrodes for achieving indoor light and heat independent regulation.

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Resolving the Band Alignment of InAs/InAsSb Mid-Wave-Infrared Type-II Superlattices

Michal Rygala, Julian Zanon, Andreas Bader, Tristan Smolka, Fabian Hartmann, Sven Hoffing, Michael E. Flatté, Marcin Motyka

e71320 | First Published: 02 June 2026



The article presents tunable ultracompact directional couplers built from Gallium Phosphide nanowires for next-generation photonic integrated circuits. It demonstrates wavelength-dependent power transfer, validates an efficient 2D design model, and reveals in situ mechanical control of optical coupling. Elastic nanowires enable reconfigurable nanophotonics in the visible range, opening new possibilities for compact, adaptive on-chip light manipulation.

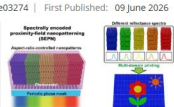
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Spectrally Encoded Proximity-Field Nanopatterning

Junhyung Park, Yun Hyeon, Hwanseok Chang, Dohyun Kim, Joonyoung Jung, Seokwoo Jeon, Jonghwa Shin

e03274 | First Published: 09 June 2026



Spectrally encoded proximity-field nanopatterning (SEPN) enables continuous control of the out-of-plane periodicity of 3D photonic crystals by tuning the exposure wavelength while maintaining a fixed in-plane period. This decouples near-infrared reflectance from visible index and allows fabrication of integrated multipattern devices with multispectral NIR signatures, providing a scalable platform for security and

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Tunable Ultracompact High-Index Gallium Phosphide Nanowire Directional Couplers

Maria A. Anikina, Alexey Kuznetsov, Dmitri V. Grudinin, Artem N. Abramov, Vladislav A. Sharov, Valeriy M. Kondratiev, Vladimir V. Fedorov, Ivan S. Mukhin, Vasily Kravtsov, Andrey A. Vysheveiy, Valeriy S. Volkov, Aleksey V. Arsenin, Alexey D. Bolshakov

e03825 | First Published: 05 June 2026



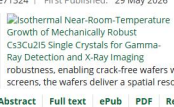
The article presents tunable ultracompact directional couplers built from Gallium Phosphide nanowires for next-generation photonic integrated circuits. It demonstrates wavelength-dependent power transfer, validates an efficient 2D design model, and reveals in situ mechanical control of optical coupling. Elastic nanowires enable reconfigurable nanophotonics in the visible range, opening new possibilities for compact, adaptive on-chip light manipulation.

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Isothermal Near-Room-Temperature Growth of Mechanically Robust Cs₃Cu₂I₅ Single Crystals for Gamma-Ray Detection and X-Ray Imaging

Yanqi Zhang, Lilei Zhang, Yusheng Ma, Haohang Song, Mingkang Yang, Huajie Wang, Linchao Fan, Xuesong Li, Yang Liu, Xutao Tao

e71324 | First Published: 29 May 2026



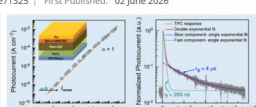
We grow Cs₃Cu₂I₅ single crystals (~3 cm) in less than 10 days via antisolvent diffusion under near-room temperature isothermal conditions. This approach suppresses thermal stress and improves mechanical robustness, enabling crack-free wafers with excellent structural integrity. As direct X-ray scintillation screens, the wafers deliver a spatial resolution of 18.3 lp/mm at MTF = 0.2.

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Self-Powered FAPbI₃ Perovskite Quantum Dot Photodetector With Fast Response and Wide Linear Dynamic Range

Prabal D. Khanikar, Shanshan Ding, Atul Shukla, Taras Plakhotnik, Peng Chen, Samareesh Das, Lianzhou Wang, Shih-Chun Lo, Ebinazar B. Namidas

e71325 | First Published: 02 June 2026



A high-performance FAPbI₃ QD-based photodetector is reported with excellent linear photocurrent response and low-light sensitivity. The QD device has a wide LDR of 181 dB, with a rapid response speed of ~260 ms.

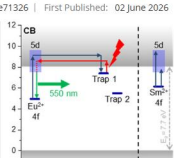
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Luminescence and Photochromism in Lanthanide-Doped Hackmanites

Joshua Baggott, Minnea Tuomisto, J. A. Gareth Williams, Sari Granroth, Ermei Mäkilä, Ari Vaisanen, Jani O. Mollanen, Mika Lastusaari

e71326 | First Published: 02 June 2026



Lanthanide-doped lithium hackmanite derivatives are prepared utilizing a doped LiAlSi₄O₈ precursor to modify luminescent and photochromic properties. Upon UV excitation, europium doping results in green Eu³⁺ persistent luminescence from shallow traps. Contrarily, samarium doping induces unusual near-infrared photochromism. This doping demonstrates tunable optical functionality for lighting and UV-sensing applications.

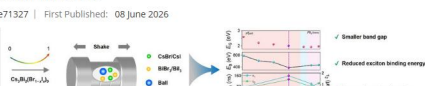
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Tuning Excitonic Properties and Charge Carrier Dynamics by Halide Alloying in Cs₃Bi₂(Br_{1-x}I_x)₂ Semiconductors

He Zhao, Elaine M. Hutter

e71327 | First Published: 08 June 2026



This work studies the effect of halide alloying in Cs₃Bi₂(Br_{1-x}I_x)₂ (0 ≤ x ≤ 1) semiconductors. The x = 0.6 shows the smallest bandgap, lowest exciton binding energy, and longest charge carrier lifetimes, showing promising properties for optoelectronic and photocatalytic applications.

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