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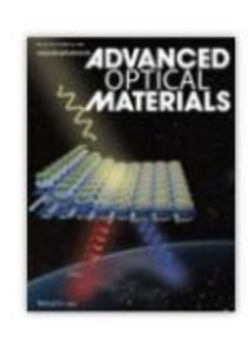

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Cover Picture

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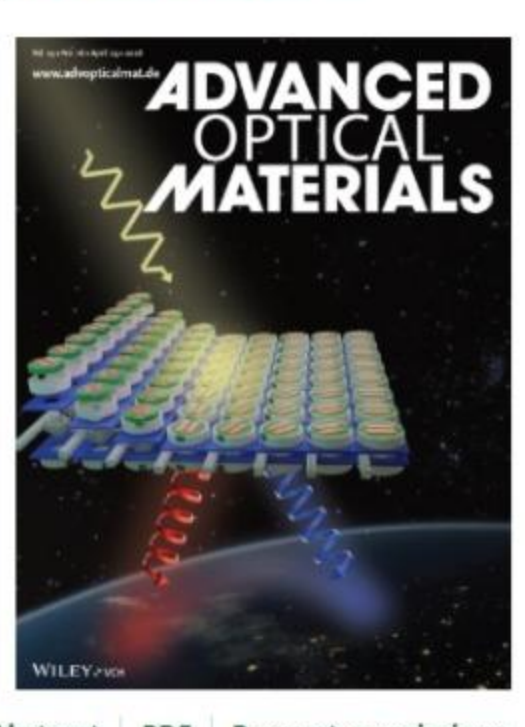
Rotation-Driven Phase Modulation in a Mechanical Gear-Matrix Metasurface for Beam Splitting, Wide-Angle Scanning, Polarization Conversion (Advanced Optical Materials 16/2026)

Chhunheng Lor, Sakobyly Kiv, Sungjoon Lim

e71176 | First Published: 24 April 2026

This article relates to:



Mechanical Gear-Matrix Metasurface
A mechanically reconfigurable metasurface is presented. A gear-matrix network sequentially rotates the unit cells with minimal power consumption, enabling controlled transmission-phase modulation for linear-to-circular polarization conversion, beam splitting, and wide-angle beam scanning, making it suitable for adaptive space applications. Reconfigurable rotation angles of the unit cells produce dynamically steerable RHCP and LHCP beams up to ±70°. More details can be found in the Research Article by , Sungjoon Lim and co-workers (DOI: 10.1002/adom.202503218).

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Back Cover

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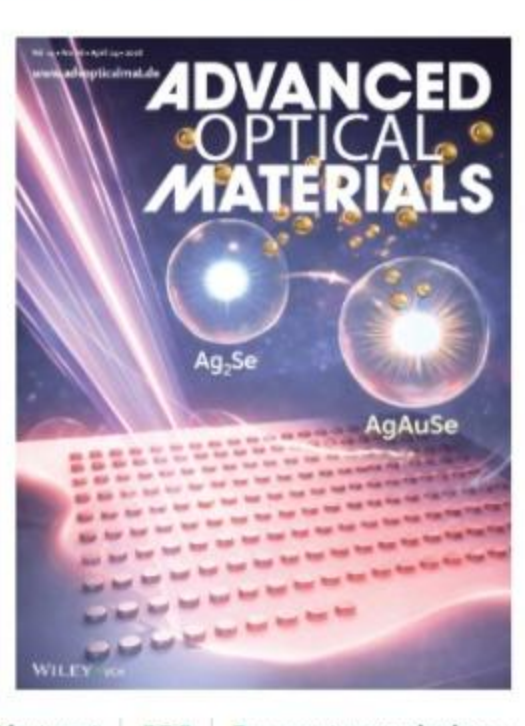
Enhancing Near-Infrared Emission From AgAuSe Quantum Dots With Dielectric Metasurface Supporting Bound States in the Continuum (Advanced Optical Materials 16/2026)

Xiaoman Li, Ruixuan Zheng, Yang Guo, Chenlu Mao, Yuanke Zhang, Fenghua Liu, Vassili A. Fedotov, Changzhi Gu, Weiping Wu

e71256 | First Published: 24 April 2026

This article relates to:



Quantum Photonic Technologies
This cover highlights a 15-fold fluorescence enhancement strategy for emerging near-infrared (NIR) colloidal quantum dots (QDs). The study proposes a silicon all dielectric metasurface that supports bound states in the continuum (BICs) to selectively boost near-infrared emission of environmentally friendly AgAuSe QDs. The cover illustrates the Au^+ cation exchange process from Ag_2Se quantum dots, demonstrating the PL enhancement of the alloyed quantum dots. More details can be found in the Research Article by Changzhi Gu, Weiping Wu, and co-workers (DOI: 10.1002/adom.202503704).

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Issue Information

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Issue Information

e71243 | First Published: 24 April 2026

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REVIEW

Open Access

Functional Persistent Luminescent Thin Films and Glasses: Materials, Processing, and Future Challenges

Luidgi Giordano, Leonnam G. Merízio, Elaine A. de Mattos, Yaman M. Nicolai, Victor M. P. da Silva, Israel D. Marques, Verônica C. Teixeira, Everton Bonturim, Rogéria R. Gonçalves, Danilo Manzani, Lucas C. V. Rodrigues

e03550 | First Published: 13 April 2026

Beyond conventional powders, persistent luminescent thin films and glass-based composites offer transformative potential for transparent, stable photonic devices. This work evaluates diverse processing routes and structure-property correlations essential for achieving optical transparency and environmental stability. Current challenges and future perspectives are discussed, offering insights into scalable fabrication for advanced sensing, imaging, and energy-storage technologies.

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RESEARCH ARTICLE

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Optoacoustic Neuromodulator by In Situ Photothermal Curing of Polydimethylsiloxane

Guo Chen, Michael Marar, Deming Li, Zhuqin Xu, Biwen Gao, Meng Zhang, Wai Yuen Cheng, Feiyuan Yu, Carolyn Marar, Ji-Xin Cheng, Chen Yang

e03610 | First Published: 13 April 2026

Photoacoustics provides a powerful tool for generating miniaturized and patterned ultrasound field. Here, we report a novel, highly versatile method for fabricating optoacoustic emitters via an in situ photothermal curing process of PDMS. This technique enables high-precision deposition across diverse platforms, including programmed flat substrates and tapered fiber tips. Utilizing this approach, we developed a candle soot-based tapered fiber optoacoustic emitter (CSTFOE) capable of generating highly localized ultrasound fields for neuromodulation.

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Rotation-Driven Phase Modulation in a Mechanical Gear-Matrix Metasurface for Beam Splitting, Wide-Angle Scanning, Polarization Conversion

Chhunheng Lor, Sakobyly Kiv, Sungjoon Lim

e03218 | First Published: 03 February 2026

This article relates to:

We present a mechanically reconfigurable metasurface driven by a gear matrix network, enabling wide-angle circular polarization (CP) beam scanning through linear-to-circular polarization (LP-to-CP) conversion, as well as the generation of right- and left-handed CP (RHCP and LHCP) components via coordinated rotation of unit cells (UCs).

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Quantum Electrometry of Non-Volatile Space Charges in Diamond

Russell M Goldblatt, Nikolai Dontschuk, Daniel J McCloskey, Andy M Martin, Alexander A. Wood

e00008 | First Published: 05 March 2026

Charges are generated when nitrogen vacancy qubits in diamond are illuminated by light. Transport and trapping in an electric field leads to the formation of large, stable space charge patterns that dynamically screen applied electric fields, impacting electric field sensing and photoelectric detection. The origins, spatiotemporal scales and amelioration of space charges is investigated using quantum electrometry.

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Sub-Symmetry-Protected Compact Edge States

Ruoqi Cheng, Domenico Bongiovanni, Ziteng Wang, Zhichan Hu, Liqin Tang, Daohong Song, Roberto Morandotti, Hrvoje Buljan, Zhigang Chen

e03497 | First Published: 30 March 2026

Sub-symmetry protected topological states represent a concept that goes beyond the conventional framework of symmetry-protected topological phases, demonstrating that topological boundary states can remain robust even when the pertinent symmetry holds only in a subset of Hilbert space. Here, we introduce and experimentally demonstrate topologically compact edge states protected by Sub-symmetry in an unbalanced cross-stitch-like lattice, characterized by quantized winding numbers. These results highlight the potential of SubSy protection to achieve topological confinement of light, paving the way for applications in compact waveguides, lasers, and high-sensitivity photonic sensors.

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Linear and Third-Order Nonlinear Optical Response of Hafnium Disulfide

Benjamin Laudert, Falk Eilenberger, Dragomir Neshev

e71164 | First Published: 14 April 2026

This study characterizes the linear and nonlinear optical response of HfS_2 thin films. Ellipsometry identifies a high in-plane refractive index (3) and wide transparency window. Third harmonic generation (THG) reveals a massive third-order nonlinear susceptibility exceeding silicon and gallium phosphide. By demonstrating thickness-tunable THG efficiency, we establish HfS_2 as a high-performance, anisotropic alternative to conventional materials for next-generation nonlinear photonics.

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GaN Mid-IR Plasmonics: Low-Loss Epsilon-Near-Zero Modes

Julia Inglés-Cerrillo, Maria Villanueva-Blanco, Benjamin Damilano, Stéphane Vézian, Miguel Montes Bajo, Adrian Hierro

e03829 | First Published: 06 April 2026

This work reports the first comprehensive experimental study of heavily doped GaN as an epsilon-near-zero (ENZ) material, including the demonstration of a plasmonic ENZ mode in GaN thin films on Si, and establishes GaN as a viable platform for mid-IR ENZ-based plasmonics. ATR measurements and TMM modelling enable detailed analysis of the hybrid surface plasmon-phonon-polariton modes present in the structures.

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Room Temperature Single-Photon Emission From Quantum Emitters Coupled to a Partially Coherent Metasurface

Amitrajit Nag, Dipak Rout, Komal Sharma, Venkatachalam P, Shankar K. Selvaraja, Jaydeep K. Basu

e03434 | First Published: 06 April 2026

This research demonstrates resonant single-photon emission outcoupling of quantum emitters coupled to a guided mode-resonant metasurface as a novel quantum photonic platform. Notable observations demonstrate a Purcell-enhanced, ultranarrow, Fano-type resonant emission mode, single-photon antibunching, and a considerably longer temporal stability of the single-photon outcoupling intensity. The outcoupling is tuned by the excitation and detection conditions, which are further explained by the spatio–temporal coupled mode theory of the metasurface's nonlocal scattering.

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Tuning of the Optical Properties of *Cis*- and *Trans*-Bis-Tetrazo[1,2-b]indazoles Guided by Predictive DFT: An Isomer Story

Louis Lemetayer, Guillaume Le Breton, Asmae Bousfiha, Marie Cordier, Yoann Rousselin, Hélène Cattey, Jean-Cyrille Hierso, Julien Roger, Paul Fleurat-Lessard, Pierre-Antoine Bouit

e03400 | First Published: 13 April 2026

We report the synthesis and properties of novel N-rich polyaromatics (*cis*- and *trans* tetrazo[1,2-b]indazoles). Following a density functional theory (DFT)-guided molecular engineering, we introduced substituents at various positions. The effect of these substituents on the spectroscopic/redox properties was fully rationalized by DFT. Depending on the isomer, the substituents and their position, we can achieve either strong luminescence in the visible or NIR absorption, while keeping an excellent electron affinity.

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Efficient Solar-Driven Polymerization Enabled by Triplet Excited State-Mediated Electron Transfer in Benzothioxanthene Imide Photocatalysts

Weiqiang Li, Zhiyao Nian, Junwen Gao, Zhaoxi Liu, Zafar Mahmood, Zecong Ye, Hui Liang, Guoxing Xu, Yuxi Sun, Yanping Huo, Shaomin Ji

e71198 | First Published: 09 April 2026

Through-space charge transfer is first applied to regulate the excited-state properties of benzothioxanthene imide photocatalysts, enabling significantly improved electron transfer efficiency, ultra-fast visible-light radical polymerization superior to commercial photoinitiators, and a new paradigm for heavy-atom-free photocatalyst development.

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Acrylic Acid–Enabled Indium Phosphide-Based Quantum Dot Inks for High-Resolution Electrohydrodynamic Patterning

Yixiao Huang, Hezixuan Zhang, Huili Bao, Jie Sun, Jiali Jiang, Runnian Han, Keke Wang, Jianguo Tang, Zhonglin Du

e03703 | First Published: 09 April 2026

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FRET Between NV Centers In Diamond And Chlorophyll Molecules: A Novel Resource For Multimodal Sensing And Imaging In Plant Cells

Sebastian Westrich, Nimba Oshnik, Nina Thiele, Nina Burmeister, Yanis Abdedou, Nikhita Khera, Stefanie J. Müller-Schüssele, Elke Neu

e00003 | First Published: 16 April 2026

We show that shallow nitrogen-vacancy (NV) centers in diamond can transfer energy to nearby chlorophyll molecules via Förster resonance energy transfer (FRET). Spectral overlap enables efficient quenching of NV fluorescence, which is reversed by bleaching the chlorophyll. The NV centers retain their spin properties, demonstrating their potential as multifunctional nanoscale sensors combining optical and magnetic readout.

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High-Resolution Conformal X-Ray Imaging and Multimodal Information Storage via Antisite Defect Engineering in Cs_2NaScF_6 Nanocrystals

Xinyao Dong, Xingyu Wu, Jianan Chen, Song Ma, Yuhan Jing, Guihua Ma, Ping Duan, Xiumei Yin, Wen Xu, Bin Dong

e71201 | First Published: 08 April 2026

Cation antisite defect engineering in Cs_2NaScF_6:Tb^{3+} nanocrystals challenges conventional isovalent doping. By leveraging ionic radius mismatch, Tb^{3+} dual-occupancy creates spatially separated deep electron traps and radiative centers. This architecture delivers an exceptional 12-h X-ray afterglow and enables a flexible, conformal detector achieving 18 lp/mm spatial resolution alongside robust 48-h latent image retention via thermal stimulation.

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Dual-Band Operation of Pixelated Electrochromic Display

Jisu Han, Juhyun Park, Chil Seong Ah, Ji-Young Oh, Sang-Hoon Jeon, Juhee Song, Tae-Youb Kim

e03667 | First Published: 08 April 2026

A pixelated electrochromic device capable of dual-band optical modulation in the visible and near-infrared regions is demonstrated. A 10 × 10 array integrated with a FPCB-based driving system enables programmable information display with low-voltage operation, highlighting a platform for spatially resolved, multispectral optical control.

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Electromagnetic Wave Localization in One-Dimensional Hyperuniform Disordered Structures

Alexander Meek, Marian Florescu

e03843 | First Published: 13 April 2026

Stealthy hyperuniform disorder in one dimension exhibits strikingly different structural and photonic behavior compared with higher dimensions. By analysing spatial correlations and electromagnetic eigenstates, we show that short-range pairing strongly shapes localization and transport regimes. Introducing a minimum separation constraint reveals tuneable localization behavior and enables photonic bandgaps, uncovering an unexpected interplay between correlated disorder and photon transport.

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Disentangling Vibronic Coupling and Conformational Disorder in Flexible NDI–T2 Donor–Acceptor Co-Oligomers

Maximilian F. X. Dorfner, Ajeet Kumar, Erling Thyrhaug, Rukiya Matsidik, Michael Sommer, Jürgen Hauer, Frank Ortmann

e03727 | First Published: 16 April 2026

This work uses a first-principles-parameterized vibronic model combined with matrix-product-state simulations to reveal how coupled excitonic and vibrational interactions give rise to the unusually broad visible absorption in naphthalene-diimide–bithiophene copolymers. The approach establishes a quantitative link between molecular geometry, vibronic structure, and experimentally observed optical spectra.

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Multi-Order Bragg Response and Field-Driven Polarization Switching in Heliconical Cholesteric

Chien Yeh Sung, Yi Chen Wu, Nien Chen Lee, Fumito Araoka, Hui-Yu Chen

e71208 | First Published: 16 April 2026

We demonstrate a heliconical liquid-crystal system exhibiting normal-incidence multi-order Bragg reflections with polarization selectivity and two-stage electro-optic behavior. Field-induced axis tilt enables coexisting P and P/2 modes, robust across alignments and temperatures. Integrated experiments and modeling reveal metastable configurations, offering tunable control of wavelength, diffraction order, and polarization for advanced photonic applications.

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