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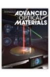

Advanced Optical Materials: Volume 14, Issue 41

6 November 2026

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COVER PICTURE

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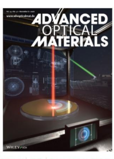
Low Reflectance all-Glass Metasurface Lenses Based on Laser Self-generated Nanoparticles (Advanced Optical Materials 41/2026)

Jae Hyuck Yoo, Nathan J. Ray, Mike A. Johnson, Hoang T. Nguyen, Eyal Feigenbaum

e71897 | First Published: 06 November 2026

This article relates to:



Metasurface Optics
Metasurface optics made of all-fused-silica-glass and presenting an extremely low reflection have been fabricated by laser-controlled self-organizing mask formation followed by optimized ion etching. The self-organizing working principle enables the production of large amounts of nano-elements at-once, thus creating a path for aperture scaleup. These combined attributes hold promise for high-power laser optics applications. More details can be found in the Research Article by Eyal Feigenbaum and co-workers (DOI: 10.1002/adom.71779).

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ISSUE INFORMATION

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Issue Information

e71941 | First Published: 06 November 2026

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RESEARCH ARTICLE

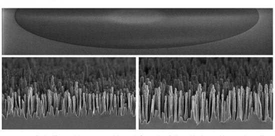
Full Access

Low Reflectance all-Glass Metasurface Lenses Based on Laser Self-generated Nanoparticles

Jae Hyuck Yoo, Nathan J. Ray, Mike A. Johnson, Hoang T. Nguyen, Eyal Feigenbaum

e71779 | First Published: 12 September 2026

This article relates to:



Laser-controlled self-organizing nanoparticle mask formation followed by ion etching produce all-fused-silica metasurfaces with ultra-low reflection, demonstrating 1 mm axicon and shadower optics. The approach scalability, high-throughput, and durability could benefit high-power lasers metasurface optics.

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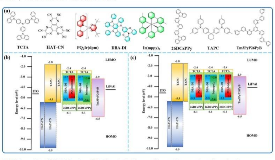
High-Efficiency TADF-Sensitized WOLEDs With Suppressed Efficiency Roll-Off Enabled by an R-G-R Sandwich Architecture

Liang He, Jingting Luo, Xiaotong Wei, Weidong Sun, Danyang Zhang, Jingyu Wang, Xiaoyang Xia, Hao Wang, Yufu Sun, Haoran Yang, Guodong Sun, Weiqiang Liu, Liang Zhou

e71905 | First Published: 30 October 2026



A TADF-sensitized WOLED using DBA-DI as both blue emitter and energy-transfer relay is constructed with a TCTA:26DCzPPy mixed host and an R-G-R sandwich emitting layer. Spatial regulation of red/green emission channels and optimized DBA-DI concentration balance multichannel energy transfer, enabling 28.0% maximum EQE and 24.56% EQE at 1000 cd m^{-2} with suppressed efficiency roll-off.

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A Dual-Excitation Light-Harvesting System Based on a Flexible Silicon Composite Containing $Ca_2Sr(PO_4)_2$: Ce^{3+}, Sm^{3+}, Designed for Multimodal Anti-Counterfeiting and Secure Information Encryption

Marek Adaszyński, Kacper Adamczak, Dagmara Stefańska

e71953 | First Published: 14 October 2026

Dual-excitation $Ca_2Sr(PO_4)_2$: Ce^{3+}, Sm^{3+} phosphor exhibit tunable, temperature-dependent luminescence driven by $Ce^{3+} \rightarrow Sm^{3+}$ energy transfer and emission from multiple sites. The system enables reversible emission color switching and complex optical signal for anti-counterfeiting. A flexible security composite label and excitation-controlled encoding platform demonstrate its potential for secure data encryption and advanced authentication technologies.

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Bias-Switchable UV-Broadband Dual-Mode Photodetector Enabled by a WSe_2/GaN Vertical Heterojunction

Zhanhong Ma, Tianyu Ma, Jiawei Chen, Yujing Wang, Yong Tan, Wenkai Zhu, Kaiyou Wang, Lixia Zhao

e71954 | First Published: 28 October 2026

This work develops a bias-tunable broadband photodetector based on vertical WSe_2/GaN van der Waals heterostructures. The device realizes switchable UV-selective and broadband detection, achieving ultra-low dark current and ultrafast response. It provides a feasible platform for high-performance adaptive optoelectronic devices.

Abstract | Full text | ePub | PDF | References | Request permissions

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Regulating the Order–Disorder Phase Controlling in $K_2RbInCl_6$ Single Crystal Toward the Highly Efficient Luminescence

Mosheng Cai, Qinglin Meng, Ziqiao Wu, Panheng Wang, Xiaoming Zhang, Chengjing Huang, Jiandong Fan, Wenzhe Li

e71955 | First Published: 13 October 2026

The order–disorder phase controlling in $K_2RbInCl_6$ is regulated through a crystallization-kinetics-modulated process. Enhanced cation ordering suppresses lattice mismatch, nonradiative recombination, and improves luminescence efficiency. The underlying mechanism linking lattice distortion, structural ordering, and optical performance is systematically elucidated, providing a strategy for designing high-performance lead-free perovskites and develop applications in optical communication encryption based on tunable emission.

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Experimental and Theoretical Investigation of Eu^{3+}-Doped $LiTaGeO_5$ Red Emitting Phosphors for Solid-State Lighting

Keyi Li, Caixia Dong, Jiaxuan Zhang, Jucai Yang, Hong Li, Zhaofeng Yang

e71956 | First Published: 14 October 2026

Eu^{3+}-activated $LiTaGeO_5$ is identified as a multifunctional red phosphor in which Eu^{3+} preferentially occupies Li sites and generates intense 611 nm red and 704 nm deep-red emission. Favorable thermal stability and efficient NUV excitation enable high-color-rendering pc-WLEDs, while the deep-red component further supports transmission imaging and anti-counterfeiting applications for solid-state lighting and optical technologies.

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Efficient, Persistent and Color-Tunable Room-Temperature Phosphorescence by a Protonation Strategy

Chensheng Li, Fushun Liang, Xuesi Chen

e71957 | First Published: 19 October 2026

Phenylpyridine (PPy) derivatives have no RTP intrinsically. Persistent and efficient RTP have been activated by a protonation strategy. Moreover, the phosphorescence color-tuning can be achieved by simply changing the substituents on the PPy moiety.

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Zinc Halide-Assisted Coordination Repair Enables High Photoluminescence Quantum Yield Purification of InP Quantum Dots

Xijian Duan, Haiwei Han, Deqi Zhao, Junjie Hao, Jingrui Ma, Lei Jin, Kai Wang, Lars Samuelson, Xiao Wei Sun

e71958 | First Published: 20 October 2026

A $ZnCl_2$-assisted coordination repair strategy resolves InP QDs purification trade-offs. $ZnCl_2$ strips excess oleylamine, stearate and partial thiol ligands while $ZnCl^+$ and Cl^- passivates exposed surface defects. Treated InP QDs retain 87% PLQY with ~32% organic ligand reduction, delivering red QLEDs with doubled external quantum efficiency over conventionally washed samples.

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Basis-Independent Geometric Phase Modulation in Circularly Birefringent Plasmonic Structures

Pasha Goz, Akash Das, Andre Yaroshevsky, Yuri Gorodetski

e71959 | First Published: 24 October 2026

Here we introduce a plasmonic metasurface composed of spatially rotated chiral spiral unit cells designed to produce space-variant circular retardance. This generates a geometric phase ramp equivalent to a blazed grating, leading to polarization dependent diffraction orders in momentum space. By tuning the period of the structure, we demonstrate a unidirectional plasmonic excitation based on the incident linear state.

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Novel Carbonyl/Nitrogen Polycyclic Frameworks for Developing Multi-Resonance Materials with Narrow-Spectrum Emissions

Ting Guo, Zhangshan Liu, Lingfeng Gan, Zhucheng Liu, Zebing Zeng, Ben Zhong Tang, Zujin Zhao

e71960 | First Published: 14 October 2026

A facile method to create C—O/N polycyclic frameworks for multi-resonance (MR) compounds is reported in this work, and a series of novel blue and sky-blue MR compounds with narrow emission spectra are successfully synthesized and systematically investigated.

Abstract | Full text | ePub | PDF | References | Request permissions

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Constructing Efficient Narrow-Spectrum Circularly Polarized Organic Light-Emitting Diodes with Near-Ultraviolet Chiral Assistant Dopants

Jiajie Zeng, Ruiqi Sun, Tingxuan Guo, Fangfang Luo, Guoxia Hao, Xing Wu, Letian Xu, Ben Zhong Tang, Zujin Zhao

e71961 | First Published: 19 October 2026

New near-ultraviolet chiral materials with circularly polarized luminescence are developed, which can serve as assistant dopants for narrow-spectrum blue, green and orange multi-resonance thermally activated delayed fluorescence materials in organic light emitting diodes (OLEDs), furnishing impressive external quantum efficiencies and dissymmetry factors of up to 38.65% and 8.67×10^{-3}, respectively.

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Metasurface-Engraved Light Emitters for Reshaping Radiation Patterns

Junhyeok Jang, Kyuho Kim, Byungchoon Yang, Changhyun Kim, Taewon Choi, Byoungho Lee, Yoonchan Jeong

e71962 | First Published: 24 October 2026

Metasurface-engraved light emitters offer a highly effective approach to precisely reshape and steer radiation patterns. By structuring a deliberately thickened epitaxial layer, this design achieves full phase control and significantly enhances light extraction without compromising inherent spectral characteristics. This integration-friendly strategy unlocks new potentials for directional photon management in next-generation immersive displays.

Abstract | Full text | ePub | PDF | References | Request permissions

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Dynamic Exciton–Color Center Switching and Multicolor/Dark Luminescence in $Cs_3Cu_2Cl_5$ for Multilevel Sensing

Ruonan Miao, Wenjie Liu, Jiyang Fan

e71963 | First Published: 19 October 2026

This study reports the phase transition (“bright” 1D *Cmcm* phase with robust green emission into a “dark” 0D *Pnma* phase) of $Cs_3Cu_2Cl_5$ as well as ion-diffusion-driven conversion of luminescence mechanism (from exciton to color center), highlighting the interplay of heat and humidity in molding the diverse phases and emission dynamics of copper halide compounds.

Abstract | Full text | ePub | PDF | References | Request permissions

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High-Performance Organic Phototransistor Memory Utilizing a Brønsted Acid Charge-Transfer Mechanism

Yu-Kai Huang, Ya-Shuan Wu, Qi-An Hong, Cheng-Liang Liu, Yan-Cheng Lin, Wen-Chang Chen

e71964 | First Published: 19 October 2026

A Brønsted-acid-induced charge-transfer mechanism is proposed to enhance the performance of organic phototransistor memory. The protonation-driven CT interaction stabilizes charge carriers within the electret layer and enhances charge-trapping capability.

Abstract | Full text | ePub | PDF | References | Request permissions

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Adjoint-Designed Mosaic Optical Fourier Surfaces for Short-Distance Red-Green-Blue Color Mixing From Spatially Separated Emitters

Dongjae Baek, Heerin Noh, Seunghak Lee, Jaewon Lee, Seungwoo Lee

e71966 | First Published: 21 October 2026

An adjoint-designed mosaic optical Fourier surface uses 225 locally programmed sinusoidal tiles to homogenize light from spatially separated RGB emitters over a 5 mm distance. All-tile RCWA and independent FDTD checks validate the detector-level color improvement, while boundary, tolerance, and fabrication-window analyses connect the inverse-designed optical response to scalable holographic manufacturing.

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Intrinsically Stretchable Ortho-Steric Engineered MR-TADF Polymers With in Situ Hypercrosslinking for Narrowband Deep-Blue OLEDs

Hai Zhou, Xinxin Ban, Xiaoyue Wang, Tao Xu, Youqiang Qian, Shilong Feng, Jingxian Qiu, Zhaoxiang Han, Zekai Wu, Youdong Sun, Jiangqi Jiang, Wenli Shi, Kaiyong Sun, Aiyun Zhu

e71967 | First Published: 24 October 2026

In situ hypercrosslinked multi-resonance thermally activated delayed fluorescence polymers are constructed via ortho-steric engineering, simultaneously achieving narrowband deep-blue emission with CIE $y < 0.1$ and intrinsic stretchability. Flexible OLEDs based on these polymers retain favorable electroluminescent performance under tensile and bending deformation, offering a novel design paradigm for stretchable high-definition optoelectronic devices.

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Solid-State Visible-to-Shortwave Infrared Optical Downconverters Using Nanoscale Bulk Heterojunction Quantum Dots Ensemble

Sarjeet Kumar, Ankush Kumar Patel, Santanu Pradhan

e71968 | First Published: 22 October 2026

The nanoscale ensemble of solution-processed PbS quantum dots and $CsPbBr_3$ nanocrystals serves as an efficient visible-to-shortwave infrared optical down-converter. $CsPbBr_3$ absorbs UV/visible photons and transfers the photogenerated charge carriers to PbS quantum dots, where they recombine to produce shortwave infrared light. The technique offers a versatile, low-cost solution for a range of shortwave infrared applications.

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Antireflection Mechanism and Reflectance Optimization Modeling of Three-Level Hierarchical Micro-Nano Structures

Xuefei Liu, Chuanzhen Huang, Hanlian Liu, Dun Liu, Dongkai Chu, Peng Yao, Bin Zou, Hongtao Zhu, Zhen Wang, Longhua Xu, Shuiquan Huang

e71969 | First Published: 21 October 2026

This work reveals the antireflection mechanisms of prefabricated three-level monocrystalline silicon micro-nano structures integrating V-grooves, LIPSS and random nanoparticles, including V-groove light trapping effect, substrate-internal multi-order diffraction of LIPSS and the effective medium effect of random nanoparticles. A reflectance model is established to predict the reflectance of such complex hierarchical surfaces.

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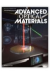

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6 November 2026

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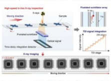
RESEARCH ARTICLE

Full Access

Synergistic Time-Delay Integration X-Ray Imaging with Pixelated $Cs_3Cu_2I_5$ Scintillators for High-Fidelity In-Line Inspection

Jianwei Gong, Xiaoke Huang, Xiaoze Wang, Xiaokun Li, Zhijian Yang, Qinxia Wu, Xiaoling Chen, Tingting Wu, Zhenzhen Zhang, Yu He, Qiushui Chen, Xiaodan Wu, Xiaofeng Chen, Huanghao Yang

e71970 | First Published: 24 October 2026



A synergistic approach combining a pixelated $Cs_3Cu_2I_5$ scintillator array with time-delay integration (TDI) linear scanning overcomes the longstanding trade-off between spatial resolution and detection sensitivity in X-ray imaging. The system achieves a spatial resolution of 27.9 lp mm^{-1}, a 29.8-fold sensitivity enhancement, and continuous high-speed scanning at 22.3 mm s^{-1} with a throughput exceeding 130 chips per minute. This work establishes a transformative platform for high-throughput, high-fidelity in-line nondestructive inspection.

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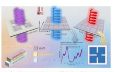
Temperature-Dependent Spectral and Electrical Characteristics of THz Metasurfaces Integrated With Patterned GaN Thin Films

Lanju Liang, Xin Yan, Qing Liu, Zhenhua Li, Haiyun Yao, Ziqun Wang, Xiaofei Hu, Yan Xu, Tigang Ning, Li Pei

e71971 | First Published: 21 October 2026



Patterned GaN thin films are integrated with THz metasurfaces to investigate geometry-dependent thermal modulation. Compared with square-patterned and continuous GaN configurations, the strip-patterned metasurface exhibits stronger heating-dependent transmittance modulation, resonance contrast, and phase variation, demonstrating that semiconductor patterning effectively tailors electromagnetic coupling and enhances thermally tunable THz responses.

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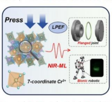
Defying Octahedral Preference: 7-Coordinated Cr^{3+} for Trap-Free Near-Infrared Mechanoluminescence

Jiahua Zhang, Jiaqi Chen, Yuhe Shao, Jinxin Wang, Haowen Liu, Zhuofan Cao, Jia Shi, Mingyue Chen, Zhen Song, Quanlin Liu

e71972 | First Published: 22 October 2026



Defying the conventional octahedral preference, trivalent chromium (Cr^{3+}) is successfully stabilized in an anomalous 7-coordinated site within the $SrGa_2Si_2O_8$ host. This configuration induces a localized piezoelectric field under mechanical stress, driving trap-free, self-recoverable near-infrared mechanoluminescence. This mechanism enables real-time sealing monitoring in flanged joints and dynamic deformation tracking in bionic robotic joints.

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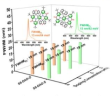
Efficient Ultra-Narrowband Green Emitters Achieved by Integrating a C—O/N-Type Multi-Resonance Skeleton With Bis-Spiro Structures

Lu Liang, Yincai Xu, Yashu Wang, Cheng Qu, Kaiqi Ye, Zuolun Zhang

e71973 | First Published: 24 October 2026



Through integrating a multi-ring fused C—O/N-type multi-resonance skeleton with bis-spiro structures, two emitters featuring efficient ultra-narrowband green emission with full width at half maximum of 13 nm in toluene and 18–19 nm in electroluminescent devices have been achieved.

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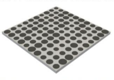
Hyperuniform Disorder in Photonic Crystal Slabs With Intrinsic Non-Hermiticity

Zeyu Zhang, Koorosh Sadri, Brian Gould, Mikael C. Rechtsman

e71974 | First Published: 26 October 2026



Light propagation in photonic crystal slabs with imposed hyperuniform disorder is investigated theoretically and numerically. The hyperuniform disorder is imposed by varying the hole size. The photonic crystal is intrinsically non-Hermitian due to radiative loss, with non-Hermiticity appearing as a complex effective mass of a quadratic photonic band. In contrast to the power law behavior observed in the Hermitian case, the scattering loss in the non-Hermitian band is significantly altered by the non-Hermiticity, such that the leading order is always a finite constant.

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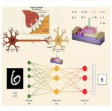
Persistent Photoconductivity and Gate-Tunable Synaptic Plasticity in Few-Layer $MoS_2/MnPSe_3$ Vertical Heterojunctions

Chenyi Huang, Tao Zhu, Peipei Zhu, Jingru Dong, Xueyi Huang, Guanxiao Chen, Yinghui Zhou, Yufeng Zhang, Weiwei Cai, Xueao Zhang

e71975 | First Published: 24 October 2026



A few-layer $MoS_2/MnPSe_3$ vertical heterojunction exhibits broad spectral photoresponse, trap-assisted persistent photoconductivity, and gate-tunable synaptic plasticity. Optical pulses induce retained conductance states with wavelength-dependent amplitudes but similar normalized relaxation kinetics, while gate pulses regulate their recovery. The measured conductance updates support device-informed handwritten-digit recognition, demonstrating multifunctional optoelectronic synaptic functionality.

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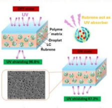
Ultraviolet-Shielding and Low-Voltage Polymer-Dispersed Liquid Crystal Smart Windows Enabled by Rubrene Incorporation

Rab Nawaz, Yu Wu Wang, Chi Yen Huang, Che Ju Hsu

e71978 | First Published: 27 October 2026



A rubrene-doped polymer-dispersed liquid crystal (PDLC) film is developed to create multifunctional smart windows that combine low-voltage operation with strong ultraviolet protection. Incorporating rubrene lowers both threshold and saturation voltages while boosting UV-shielding efficiency to 96.62% in the off state and 67.12% in the on state, offering a simple, scalable route to energy-saving, health-protective smart windows.

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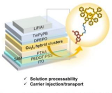
Low-Operating-Voltage Yellow-Green LEDs Based on Rationally Designed Copper-Iodide Hybrid Clusters

Kuang-Hui Song, Yu Zhou, Zhentao Ma, Peng Lu, Zhen-Yu Ma, Yong-Hui Song, Hongmin Zhou, Jing-Jing Wang, Bai-Sheng Zhu, Zhi Zhao, Qing-Lin Yang, Xusheng Zheng, Guozhen Zhang, Hong-Bin Yao

e71979 | First Published: 27 October 2026



A novel design of copper-iodide hybrid clusters for host-free yellow-green light-emitting diodes. This cluster modification strategy enables the formation of an ultrathin, uniform emissive layer with improved carrier injection and transport, thereby achieving high-quality electroluminescence at low driving voltage.

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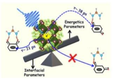
Role of A-Site Host–Guest Binding Affinity in Governing Ultrafast Hole Dynamics of Perovskite Nanocrystals

Mansi Gupta, Shovon Chatterjee, Kanak Singh, Vijay Kumar, Tushar Debnath

e71980 | First Published: 24 October 2026



Among three dihydroxybenzene isomers, catechol forms dual hydrogen bonds with FA^+ ions in $FAPbBr_3$ nanocrystals, enabling ultrafast hole transfer (21 ps). In contrast, hydroquinone exhibits slower transfer, while resorcinol shows no measurable charge transfer despite favorable energetics. These findings demonstrate that interfacial binding geometry, coupling strength, and thermodynamic driving force are intricately interconnected in governing charge transport dynamics.

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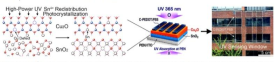
Light-Driven Defect Engineering of Oxide Heterojunctions via Concurrent Sn Redistribution and Photocrystallization for Transparent, Flexible, Self-Powered UV Photodetectors

In Soo Kim, Dayeon Ko, Hyeyoung Kim, Minwoo Park

e71981 | First Published: 27 October 2026



UV-driven Sn^{4+} redistribution and photocrystallization synergistically engineer oxide heterojunctions by passivating Cu-related defects and promoting structure ordering of the SnO_2 matrix. These concurrent processes suppress defect-mediated recombination and leakage transport while facilitating photocarrier separation and extraction. The resulting transparent UV sensing window, integrated with flexible self-powered photodetectors, enables reliable real-time monitoring of the outdoor UV index under varying weather conditions.

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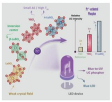
Determination of Opto-Structural Parameters to Optimize Blue-to-UV Upconversion in Pr^{3+}-Activated $\mathit{RE}BO_3$ (RE = Y, La, Lu) for Phosphor-Converted UV LEDs

Patrycja Zdeb-Stańczykowska, Nadiia Rebrova, Alexander Grippa, Leonardo F. Saraiva, Duong Pham Thuy, Tom Förster, Markus Suta, Przemysław J. Dereń

e71983 | First Published: 27 October 2026



Blue-to-UVC upconversion in Pr^{3+}-doped $REBO_3$ is dictated by the host crystal structure, which shapes the $4f^15d^1$ energy, Stokes shift, local symmetry, and phonon spectrum. Comparing aragonite, calcite and pseudo-wollastonite polymorphs reveal why YBO_3 and π-$LuBO_3$ upconvert efficiently while their structural counterparts do not, delivering opto-structural design rules for germicidal pc-UV-LED phosphors driven by low-cost blue LEDs.

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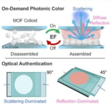
Electrically Induced Photonic Assemblies of Faceted ZIF-8 Crystals Exhibiting Binary Angle-Dependent Structural Color and Metamerism

Flora Schöfbeck, Tolga Zorlu, Michael R. Reithofer, Julian Lemmel, Daniel Hetey, Chao-Chin Huang, Youven Benseghir, Yu-Chueh Hung, Lucas V. Besteiro, Jia Min Chin

e71984 | First Published: 30 October 2026



Electric fields drive dynamic photonic assemblies that reversibly generate structural color. By tuning nanoscale organization through controlled particle disorder, the presented system exhibits a unique binary color response, switching between blue and pink depending on viewing angle. Combined with metameric design, this allows for a two-factor optical authentication strategy based on electrically activated and angle-dependent color signatures.

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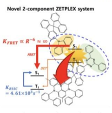
Single-Molecule Architecture Engineering of n-Type Host-Fused Multi-Resonance Emitters: Realizing Zero-Radius Intramolecular Energy Transfer in Exciplex-Based OLEDs

You Na Song, Bubae Park, Sunwoo Kang, Taekyung Kim

e71989 | First Published: 24 October 2026



Blue fluorescent dopants fused with n-type host molecules (DABNA-Spiro-2-Trz and DABNA-Spiro-3-Trz) eliminate intermolecular distance, enabling an order of magnitude higher RISC and efficient intramolecular energy transfer in OLEDs. This design achieves 15.24% external quantum efficiency while maintaining high color purity at high doping levels. The concept represents a paradigm shift from conventional host-dopant frameworks to integrated molecular architectures.

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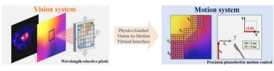
Far-Red-Centered Wavelength-Selective Non-Fullerene Organic Photodetector Arrays for Fluorescence-Encoded In-Sensor Computing

Yuqing Jian, Kaicheng Yu, Renjie Ju, Chengxin Zheng, Wenjie Zhou, Jia Yuan, Shangyang Zhou, Yu Sun, Xiaofeng Yang

e71993 | First Published: 27 October 2026


Vision system
Wavelength-selective pixels
Physics-Guided Vision-to-Motion Virtual Interface
Motion system
t₀
t₁
t₂
t₃
Y
X
(1,0)
ΔX = 1 μm
ΔY = 0 μm
Precision piezoelectric motion control

A programmable far-red-centered wavelength-selective non-fullerene organic photodetector array maps fluorescence-margin patterns to discrete recognition currents within a device-constrained reconstruction. A physics-guided vision-to-motion virtual interface uses hardware-budgeted current classification and execution-validation windows to map accepted current classes into 2-bit X/Y motion codes. Independently, a physics-guided neural network (PGNN)- based feedforward compensator mitigates piezoelectric nonlinearities.

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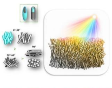
Field-Driven Assembly of Orientation-Controlled Anisotropic Colloidal Frameworks for Broadband Perfect Optical Absorption

Chenhui Wei, Yuanhao Liu, Xiaoyu Liu, Ming Fu, Dawei He, Yongsheng Wang

e71994 | First Published: 27 October 2026



Magnetic- or electric-field-driven colloidal assembly provides a versatile platform for constructing orientation-controlled, spatially aperiodic, non-close-packed architectures with rod- and ellipsoid-shaped building blocks, absorbing components configured as internal cores or external shells, and diverse metallic, oxide, and semiconductor materials; optimized anisotropic frameworks with preferential near-normal particle orientations achieve near-perfect broadband absorption and outperform sphere-based counterparts.

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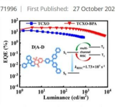
Fused Donor–Acceptor TADF Emitter Bearing Ancillary Donor: Toward High-Performance OLED With Fast Reverse Intersystem Crossing

Xiaoxiao Hu, Leyao Cai, Purui Zhang, Liang Deng, Zhiqiang Shi, Zhenhua Xu, Xusheng Xie, Ying Wang

e71996 | First Published: 27 October 2026



This work establishes the correlation between molecular conformation and RISC kinetics in D|A-D-typed TADF emitter. The precise synergistic regulation of small ΔE_{ST}, strong SOC and multichannel RISC enables fast RISC, and together with the high PLQY afforded by extended π-conjugation, resulting in high EQE with relieved efficiency roll-off. This provides a new guideline for the design of efficient TADF materials.

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Low Turn-On-Voltage Single-Layer Organic Light-Emitting Diodes With Interlayer-Free Ohmic Contacts

Zhiwen Xu, Yujie Fu, Yaxuan Pan, Yuchen Ren, Kai Liu, Zhehao Tao, Dongyue Cui, Ye Tao, Runfeng Chen

e71997 | First Published: 30 October 2026

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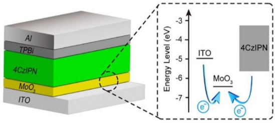

Direct interlayer-free Ohmic hole contact between MoO_3 and 4CzIPN enables single-layer green TADF OLEDs with a low turn-on voltage of 2.22 V and a low 1.5% efficiency roll-off at 1000 cd m^{-2} after systematic device optimization, offering a clean and cost-effective pathway to fabricate high-performance single-layer OLEDs.

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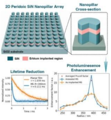
Strong Enhancement of Er^{3+} Emission at Room Temperature in Si_3N_4 Metasurfaces

Fengkai Wei, Xinru Ji, Tobias J. Kippenberg, Duk-Yong Choi, Carsten Ronning

e71998 | First Published: 30 October 2026



Erbium-doped SiN metasurfaces are engineered to support Mie resonances at $1.55\mu m$, enhancing the local density of optical states and accelerating spontaneous emission. By optimizing nanocylinder radius and implantation depth, room-temperature PL is increased about 18-fold, while lifetime shortens by nearly an order of magnitude, confirming Purcell-assisted emission in a CMOS-compatible platform.

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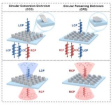
Symmetry Constrained Different Types of Maximal Chiroptical Responses in Slant Chiral Resonant Metasurfaces

Yueqi Li, Meng-Xia Hu, Pan Li, Xin Li, Xiangping Li, Yuliang Zhao, Zi-Lan Deng

e72000 | First Published: 27 October 2026


Circular Conversion Dichroism (CCD)
Circular Perserving Dichroism (CPD)
LCP
RCP
LCP
RCP

Slant metasurfaces exhibit symmetry-constrained chiroptical responses: 3D inversion symmetry supports circular-conversion dichroism, while broken 3D inversion symmetry enables circular-preserving dichroism. All configurations achieve near-unity emission DCP at the q-BIC resonance, with opposite or identical handedness from their two sides. Even when CD_T approaches zero, emission DCP remains near unity, demonstrating the independence between transmission CD and emission DCP.

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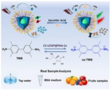
Cerium-Engineered Nanozyme With Oxidase-Like Activity for Upconversion Luminescence-based Sensing of Ascorbic Acid

Jitender Kumar, Renrui Sun, Mingjie Gu, Wei Cao, Lining Sun

e72001 | First Published: 27 October 2026



A Cerium-engineered nanozyme integrates H_2O_2-free oxidase-like activity with NIR-excited upconversion luminescence-based sensing of ascorbic acid. Ce-mediated TMB oxidation produces ox-TMB, which quenches upconversion luminescence via an inner-filter effect, while ascorbic acid restores the luminescence. The OFF→ON platform enables selective detection of ascorbic acid in water, BSA medium, and fruit samples.

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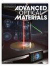

Advanced Optical Materials: Volume 14, Issue 41

6 November 2026

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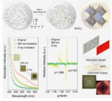
RESEARCH ARTICLE

Full Access

Synergistic Dual-Excitation-Induced Reversible Photochromism and Luminescence Modulation in $BaTiO_3$ Nanocrystal-Embedded Glass

Heping Zhao, Jiayan Liao, Shasha Fu, Yang Ci, Yingzhu Zi, Yueteng Zhang, YuenYee Cheng, Zhiguo Song, Jianbei Qiu, Ji Zhou, Zhengwen Yang

e72003 | First Published: 30 October 2026



A novel transparent Eu^{3+}-doped $BaTiO_3$ glass-ceramic was investigated. The material exhibits reversible photochromism and luminescence modulation under both 365 nm light and x-ray irradiation. By uniquely integrating photochromism, radioluminescence, and photoluminescence modulation, this material offers a novel strategy for developing transparent glass-ceramics for information storage and dual-mode x-ray imaging applications.

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