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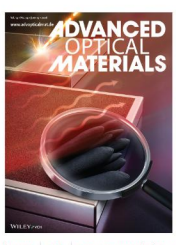
Broadband Directional Thermal Radiation with Asymmetric Femtosecond Laser-Processed Surfaces (Advanced Optical Materials 24/2026)

Andrew Butler, Andrew Reicks, Jack Schulz, Patrick Hayden, Alireza Kalantari Dehaghi, Kira Marr, Linxiao Zhu, Christos Argyropoulos, Craig Zuhlke

e71274 | First Published: 26 June 2026

This article relates to:



Directional Thermal Emission

Self-Organized Laser Functionalization (SOLF) is an advanced laser manufacturing technique that can be used to rapidly functionalize surfaces with micro- and nano-scale features. By applying SOLF at an oblique angle, overlapping asymmetric microstructures can be created. These angled microstructures exhibit extremely directional thermal radiation that is broadband and insensitive to polarization. More details can be found in the Research Article by Andrew Butler, Christos Argyropoulos, Craig Zuhlke, and co-workers (DOI: 10.1002/adom.202503762). Artwork by INMYWORK Studio.

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e71411 | First Published: 26 June 2026

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CORRECTION

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Correction to "High-Tc Superinductors Through Tailored Metamaterial Losses"

e71329 | First Published: 29 May 2026

This article corrects the following:

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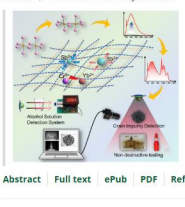
RESEARCH ARTICLE

Pressure-Induced Emission Enhancement in 1,6-Dibromopyrene Crystal by Establishing Br···Br Interactions

Yi Wang, Yonghui Lv, Xinqi Yang, Haichao Liu, Guanjun Xiao, Kai Wang, Yuxiang Dai

e71317 | First Published: 11 June 2026



Based on high-pressure experiments, we demonstrate that the formation of Br···Br interactions effectively enhances molecular packing rigidity and suppresses non-radiative decay, leading to a notable pressure-induced emission enhancement (PIEE).

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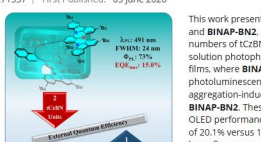
Material Engineering and Interface Regulation in Sn:PbSe/ZnO Heterojunctions Toward High-Performance, Stable, and Broadband Infrared Photodetection

Baohua An, Zexu Wang, Yuchao Wei, Yifei Xu, Hongxi Zhou, Jun Gou, Huiling Tai, Zhiming Wu, Jun Wang, Chao Chen

e71330 | First Published: 03 June 2026



A co-sputtered, in situ oxidized Sn:PbSe/ZnO heterojunction enables broadband infrared photodetection from visible to mid-wave infrared. The device achieves ultralow dark current (~40 pA cm^{-2}), high specific detectivity (~10^{10} Jones in visible-NIR, >10^{8} Jones at 3.5 µm), microsecond response, and >90% performance retention after three months in air, offering a stable, high-performance pathway for room-temperature infrared sensing.

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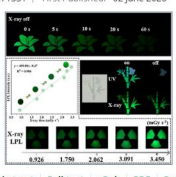
High Performance Dual-Mode X-Ray Detection Based on 0D Organic–Inorganic Hybrid Mn Halides

Ziyi Zhang, Junheng Yuan, Dedan Mu, Kai Yang, Junli Liu, Anxi Zhu, Xu Tian, Jie Yu

e71331 | First Published: 02 June 2026



This work develops a dual-mode X-ray detection material based on Cd-doped zero-dimensional organic-inorganic Mn halide. The material provides prompt radioluminescence for realtime warning and long persistent luminescence for dose recording, with a linear response to X-ray dose. Flexible wearable labels and dual-mode encryption patterns verify its great application prospects in radiation monitoring and information anti-counterfeiting.

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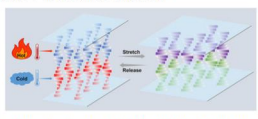
Thermo-Derived Cholesteric Liquid Crystal Elastomer Pattern with Composite Structural Colors

Li Zhong, Yi Li, Wei Liu, Yonggang Yang

e71332 | First Published: 02 June 2026



A thermochromic cholesteric liquid crystal (CLC) oligomer was synthesized for the preparation of CLC elastomer (CLCE) films with dual reflection bands. Subsequently, a CLCE pattern with composite structural colors was prepared, which was suitably applied for decoration and anti-counterfeiting.

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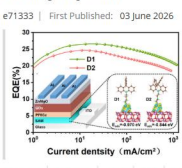
A Spiro-Type Self-Assembled Hole Injection Layer for High-Performance Quantum-Dot Light-Emitting Diodes

Siyi Ding, Desheng Li, Jing Xie, Xianming Du, Beibei Bai, Haorui Liu, Chenyize Zhao, Zongcheng Miao, Heng Zhang, Kai Chen

e71333 | First Published: 03 June 2026



A spiro-type self-assembled monolayer (D1) functions as an efficient hole injection layer in quantum-dot light-emitting diodes. The orthogonal spiro structure creates a large dipole moment and deep work function, facilitating hole injection and charge balance. The D1-based red device achieves an EQE of 26.6% and a brightness of 240 500 cd m^{-2} at 8 V, outperforming conventional PEDOT:PSS-based devices.

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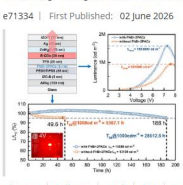
Bright and Stable Top-Emitting Quantum-Dot Light-Emitting Diode Enabled by a Self-Assembled Monolayer

Yiduo Wang, Yufeng Mai, Cuixia Yuan, Qiang Su, Heng Zhang

e71334 | First Published: 02 June 2026



Top-emitting quantum-dot light-emitting diodes incorporating a strategically placed [2-(3-bromo-6-phenyl-9H-carbazol-9-yl)ethyl]phosphonic acid (PhBr-2PACz) self-assembled monolayer between the hole injection and transport layers achieve an external quantum efficiency of 36.53%, a peak brightness of 1 583 000 cd/m^2, and an outstanding T_{95} lifetime of 28 612 h at an initial luminance of 1000 cd/m^2.

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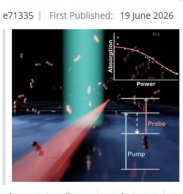
On-Chip Saturated Absorption of CO_2 in a Silicon-on-Sapphire Waveguide

Shahar Edelstein, Noa Mazurski, Uriel Levy

e71335 | First Published: 19 June 2026



We demonstrate the first saturated absorption of a molecular gas on a planar photonic chip. By coupling carbon dioxide with the tightly confined light of a silicon-on-sapphire waveguide, we achieve optical saturation using only milliwatt powers. This breakthrough provides a practical, low-power foundation for creating ultra-compact mid-infrared frequency references for precision sensing.

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Synergistic Dual-Valence Distortion and Energy Transfer Enable Ultra-Broadband NIR Emission for Advanced Detection Systems

Zhenwei Jia, Pinshu Lv, Shiwei Lu, Li Wu, Tongqing Sun, Yongfa Kong, Jingjun Xu

e71336 | First Published: 09 June 2026

A "dual-valence distortion" strategy overcomes the low efficiency of Cr^{3+} phosphors, dramatically enhancing NIR emission and quantum yield. Coupled Cr^{3+}→Yb^{3+} energy transfer further broadens emission with enhanced thermal stability. The fabricated NIR pc-LED demonstrates high performance in advanced detection systems, including non-destructive testing, grain impurity analysis, and a miniaturized real-time alcohol monitoring device with concentration alarming.

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Exploring the Synergy of Combining BINAP and tCzBN Motifs Within Multi-Resonant TADF Emitters to Enhance OLED Performance

John Marques dos Santos, Debasish Barman, Rangani Wathsala Weerasinghe, Tomas Matulaitis, David B. Cordes, Aidan P. McKay, Youichi Tsuchiya, Chihaya Adachi, Eli Zysman-Colman

e71337 | First Published: 03 June 2026

This work presents two MR-TADF emitters, **BINAP-BN1** and **BINAP-BN2**, based on a BINAP core and differing numbers of tCzBN units. Both emitters show similar solution photophysics, but distinct behavior in doped films, where **BINAP-BN1** exhibits higher photoluminescence quantum yield and suppressed aggregation-induced emission broadening compared to **BINAP-BN2**. These differences translated into superior OLED performance for **BINAP-BN1**, reaching an EQE_{max} of 20.1% versus 14.1% for **BINAP-BN2**. A hyperfluorescence device using **BINAP-BN1** further improved EQE_{max} to 22.0% and reduced efficiency roll-off at high luminance, confirming the advantages of its molecular design for high-performance MR-TADF OLEDs.

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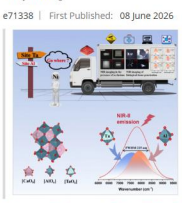
Thermally Robust Broadband NIR-II Emission Enabled by Dual-Site Ni^{2+} Occupancy in Double Perovskite

Zhidan Liu, Qiufeng Shi, Lei Wang, Haijie Guo, Dawei Wang, Konstantin V. Ivanovskikh, Jianwei Qiao, Xiao-Jun Wang

e71338 | First Published: 08 June 2026



A dual-site Ni^{2+} occupancy strategy in a double perovskite lattice effectively breaks the intrinsic trade-off between emission bandwidth and thermal stability. Dynamic ion redistribution across distinct octahedral sites enables tunable, ultrabroad NIR-II emission with exceptional high-temperature resilience. This site-selective mechanism establishes a versatile and generalizable strategy for the rational design of infrared-emitting luminescent materials.

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Designing Full-Color Holographic Plastic With High Reliability for AR Displays

Hongxi Guo, Ya Xie, Dengfu Lu, Yonggui Liao, Haiyan Peng, Xiaolin Xie

e71339 | First Published: 03 June 2026

By designing an orthogonal photopolymerization system, high-performance full-color holographic plastic is achieved that exhibits both high optical quality (η_{Bragg} = 84.8%, n_1 = 0.052, haze = 1.9%) and remarkable reliability (>1000 h @85°C), promising robust devices for high-fidelity AR display in full color.

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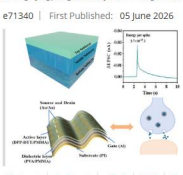
Self-Stratified Trilayer Architecture Enables Multifunctional Flexible Organic Photonic Synaptic Transistors With Ultra-Low Energy Consumption

Bohao Song, Zechen Liang, Xin Wang, Yi Zhao, Xian Tang, Xianqiang Xie, Zirui Wang, Dandan Zhang, Jingpeng Wu, Laju Bu, Dongfan Li, Guanghao Lu

e71340 | First Published: 05 June 2026



The self-stratified trilayer architecture is spontaneously formed by one-step blending of DPP-DTT and PMMA, and a flexible organic photonic synaptic transistor with multiple functions is successfully constructed. It features a high on/off ratio of over 10^8 and a remarkable photosensitivity of 2.61 × 10^4, with an ultra-low electrical energy consumption as low as 2.7 aJ per synaptic event.

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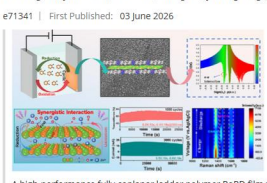
Fully Coplanar Ladder Phenazine-Based n-Type Polymer for High-Performance Electrochromic Energy Storage Using Zn^{2+}/H^+ Hybrid Aqueous Electrolyte in an Atmospheric Environment

Zhicheng Wu, Jinke Chen, Dafa Cao, Zheng Xie, Jinming Zeng, Juan Liu, Tongxiang Liang

e71341 | First Published: 03 June 2026



A high-performance fully coplanar ladder polymer PoPD film was fabricated via a simple and efficient interfacial electropolymerization technique. Through the synergistic integration of structural design and electrolyte ion regulation, favorable electrochromic energy storage performance and excellent cycling stability are achieved, thereby providing new insights for the development of electrochromic energy storage devices.

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Adaptive Hyperspectral Reconstruction Under Spatial Multiplexing via a Position-Calibrated Metasurface

Rui Xia, Shichuan Wang, Zihan Mei, Ming Zhao, Zhenyu Yang

e71342 | First Published: 02 June 2026

Here, we demonstrate an adaptive metasurface-enabled hyperspectral sensing framework that enables accurate spectral reconstruction under spatial multiplexing. By introducing a position calibration layer into the reconstruction network, position-dependent spectral encoding is explicitly addressed, allowing a single trained model to robustly generalize across different super-pixels. The proposed system achieves high-fidelity hyperspectral reconstruction across the visible spectrum, offering a compact and physically grounded platform for advanced spectral imaging applications.

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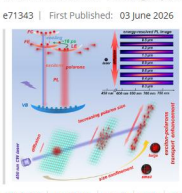
Enhancement of Exciton-Polaron Transport in $CsSnBr_3$ Perovskite Nanowires via Lateral Size Engineering

Lin Chen, Yueran Zhao, Guanxing Li, Jiawen Wang, Peng Wang, Minliang Lai, Qiuchen Zhao

e71343 | First Published: 03 June 2026



The graphic elucidates the microscopic mechanism underlying enhanced exciton-polaron diffusion in quasi-1D confined $CsSnBr_3$ nanowires: photoexcited carriers form exciton-polarons after cooling, which diffuse while recombining on a longer timescale. Reduced lateral size weakens exciton-phonon coupling, not only enhancing exciton-polaron transport but also increasing polaron size; under higher excitation power, large exciton-polarons in the quasi-1D system exhibit augmented diffusion.

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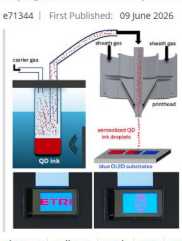
Aerosol Jet Printed Polymer-Free High Aspect Ratio Quantum Dot Films for Enhanced Color Conversion

Sukyung Choi, Anna Meredith, Hyunsu Cho, Zahra Bahrami, Kevin Schnittker, Joseph Andrews

e71344 | First Published: 09 June 2026



Polymer-free quantum dot color conversion layers are aerosol jet printed at high aspect ratio by tuning the aerosol focus ratio to induce in-flight droplet drying. Contact-line pinning suppresses lateral spreading, enabling ~10 µm-thick films at ~50 µm widths with blue light leakage below 0.25% and conversion efficiency approaching 18%, demonstrated directly on blue OLED unit devices and a 0.7-inch OLEDoS microdisplay.

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