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Free Access | A Review on Ultrashort Pulse Laser Welding Technology (Advanced Optical Materials 10/2026)

Hao Yuan, Chun Li, Bo Yang, Yongbo Liu, Yunfei Cao, Hao Jiang, Haoran Yang, Xiaojing Si, Jian Cao

10/2026 | First Published: 12 March 2026

This article relates to: Ultrashort Pulse Laser Welding Technology



3D-Printed Photonic Systems

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Free Access | Photonic Hybrid Integration: Strategies and Promises of Advanced Additive Manufacturing (Advanced Optical Materials 10/2026)

Zhilian Shi, Huayu Huang, Richard Perly, Qiang Cheng

10/2026 | First Published: 12 March 2026

This article relates to: 3D-Printed Photonic Systems



Back Cover

Free Access | Exciton-Polariton Effect and Polarized High-Quality Lasing in 1D CsPbBr3/CsPb2Br5 Perovskite Planar Microcavities via Solution-Driven Soft Thermal Imprinting (Advanced Optical Materials 10/2026)

Hsin-Ming Cheng, Fang-Chi Lo, Sheng-Chan Wu, Chia-Kai Lin, Wen-Chi Huang, Bo-Hong Lin, Chun-Hung Lin, Hsu-Cheng Hsu

10/2026 | First Published: 12 March 2026

This article relates to: Perovskite Planar Microcavities



Perovskite Planar Microcavities

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A Review on Ultrashort Pulse Laser Welding Technology

Hao Yuan, Chun Li, Bo Yang, Yongbo Liu, Yunfei Cao, Hao Jiang, Haoran Yang, Xiaojing Si, Jian Cao

10/2026 | First Published: 24 October 2025

This article relates to: Comprehensive review of ultrashort pulse laser welding technology, covering transparent materials welding, transparent opaque materials welding, and opaque materials welding.

Abstract | Full text | PDF | References | Request permissions

Open Access | Photonic Hybrid Integration: Strategies and Promises of Advanced Additive Manufacturing

Zhilian Shi, Huayu Huang, Richard Perly, Qiang Cheng

10/2026 | First Published: 21 December 2025

This article relates to: Heterogeneous photonic integration combines wafer bonding, transfer printing, and advanced multi-photon lithography to realize compact, adaptable photonic systems.

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Open Access | Engineered Optical Fibers for Deep-Tissue Applications

Yuchen Li, Siyang Zheng, Wenzhao Li, Kai Chen, Tianming Zhong, Chi Man Woo, Weiran Pang, Chuqi Yuan, Xiaohou Xiao, Xiangguang Yang, Long Jin, Xiang Qian, Qiyao Tan, Changquan Yu, Liwei Liu, Junliu Qiu, Pujiang Lai

10/2026 | First Published: 05 March 2026

This review establishes a foundational framework for designing optical fibers for deep-tissue medicine, systematically linking material innovations like polymers and hydrogels with structural paradigms to enable state-of-the-art diagnostics, including endoscopy and biosensing, and targeted therapeutics, guiding future clinical translation.

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REVIEW

Hall of Fame

Recent Advances on Terahertz Wave Generation and Synchronous Control

Quan Xu, Yongchang Liu, Xi Feng, Qingwei Wang, Li Niu, Liyuan Liu, Xueqian Zhang, Jiaqiang Han, Weili Zhang

10/2026 | First Published: 05 March 2026

This review summarizes recent progress in terahertz generation and synchronous control, emphasizing the synergistic integration of nonlinear optics and meta-optics to achieve multi-parameter modulation of THz waves, such as amplitude, phase, polarization, frequency, and wavefront.

Abstract | Full text | PDF | References | Request permissions

CORRECTION

Correction to "Selective and Sensitive Detection of Cu<sup>2+</sup> in Living Cells Based on Chelator Modified Carbon Dots"

10/2026 | First Published: 17 February 2026

This article corrects the following: Full text | PDF | Request permissions

Research Article

Exciton-Polariton Effect and Polarized High-Quality Lasing in 1D CsPbBr3/CsPb2Br5 Perovskite Planar Microcavities via Solution-Driven Soft Thermal Imprinting

Hsin-Ming Cheng, Fang-Chi Lo, Sheng-Chan Wu, Chia-Kai Lin, Wen-Chi Huang, Bo-Hong Lin, Chun-Hung Lin, Hsu-Cheng Hsu

10/2026 | First Published: 30 September 2025

This article relates to: Shaping dual-phase CsPbBr3/CsPb2Br5 microwires by a simple soft imprinting process unlocks exceptional Fabry-Pérot lasing (Q = 6520) and strong exciton-photon coupling.

Abstract | Full text | PDF | References | Request permissions

Full Access | Controlled Shell Growth Enables High Quantum Yield Upconverting Nanoparticles for Thermal Sensing and Biomaging

York Estévez Serge-Correales, Fernando Eduardo Matur, Henrique Luis Piva, Sajjad Ullah, Antonio Claudio Tedesco, Luis Das Carlos, Maria Rute Ferrera André, Marc Verelst, Sidney José Lima Ribeiro, Rogéria Rocha Gonçalves

10/2026 | First Published: 19 January 2026

This study shows how increasing shell thickness in Yb<sup>3+</sup>-based core/shell upconverting nanoparticles enhances emission quantum yields and bases under near-infrared excitation. Two optical readouts based on luminescence intensity ratios provide sensitive and remote temperature measurements between 30 and 40 °C, while low cytotoxicity and confocal super-resolution imaging in fibroblasts highlight their suitability for biological applications.

Abstract | Full text | PDF | References | Request permissions

Open Access | Vat Photopolymerized HEMA/HEA Hydrogels for Solvent-Responsive Transparency and Optical Encryption

Murad Al, Mohammed Ayaz Uddin, Dileep Chekkaramkodi, Rashid K. Abu Al-Rub, Haider Butt

10/2026 | First Published: 21 January 2026

Vat photopolymerized HEMA/HEA hydrogels exhibit reversible transparency opacity switching via hydration-induced microphase separation and solvent exchange. The printed materials enable hydration sensing, optical encryption, and information storage, while maintaining high ductility and reversible rheology. This multifunctional platform bridges additive manufacturing and soft photonics, advancing adaptive materials for secure optical and sensing technologies.

Abstract | Full text | PDF | References | Request permissions

RESEARCH ARTICLE

Long-Lived S<sup>2+</sup> Center Induced by Nanosecond High-Voltage Pulse Discharge

Helen Highland, Yifan Song, Sina Ilkhani, Emmalyn Song, Sihe Weng, Stephen B. Cronin, Susumu Takahashi

10/2026 | First Published: 03 February 2026

This work demonstrates that a high-voltage pulse discharge lowers the Fermi energy of diamond, consequently inducing the charge state conversion from S<sup>1+</sup> to S<sup>2+</sup> and NV<sup>0</sup> to NV<sup>-</sup>. This method paves the way to access various charge states of defect centers in diamond and wide-bandgap semiconductors.

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Full Access | Silica-Based Er:YAG Nanocrystal Composite Fibers Enabling S+C+L Broadband Tunable Lasers

Min Sun, Yuli Fang, Jialong Li, Xu Liu, Zhenfeng Mao, Dong Cheng, Qilai Zhao, Changsheng Yang, Guowu Tang, Yongcheng Sun, Cheng Luo, Kun Yang, Tian Xue, Hai Tao, Chen, Xiaoying Wei, Shanhu Xu, Guoping Dong, Qi Qian, Zhongmin Yang, Zhuo Xu

10/2026 | First Published: 05 March 2026

We developed a novel post-feeding melt-in-tube method to fabricate silica-based Er:YAG nanocrystal composite fibers. The nanocrystal size effect significantly broadens the Stark splitting of Er<sup>3+</sup> energy levels, enabling an ultra-wide gain bandwidth. A 30-cm-length fiber in a ring cavity fiber laser configuration enables a record 126 nm tuning range and a low fusion splicing loss of 0.1 dB with single-mode fibers.

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Full Access | Red Quantum Dot Light-Emitting Diodes With 31.3% EQE Enabled by a Pyridyl-Triazine Electron Transport Material

Boyu Zhou, Mingming Zhou, Yuhua Jiang, Zongming Chang, Chengxiao Gao, Yanping Wang

10/2026 | First Published: 17 February 2026

A pyridyl-triazine electron-transport layer (mPbPyTz) passivated Zn<sup>2+</sup>-doped surface defects on QDs, suppressing interfacial non-radiative recombination. Combined with an optimized PVA hole transport layer, it enables balanced carrier injection. The resulting red QLEDs achieve champion performance with an external quantum efficiency of 31.3%, a current efficiency of 39.0 cd A<sup>-1</sup>, and a power efficiency of 35.3 lm W<sup>-1</sup>.

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Full Access | Chiral Amine CsPbBr3 Nanocrystals: Ligand Exchange Strategy-Induced Circularly Polarized Luminescence and Chirality Modulation

Chengxi Zhao, Jiefeng Xie, Jun Liu, Haiqiong Du, Shun Zhang, Huaying Gao, He Huang, Weihai Ni, Qi Xue

10/2026 | First Published: 17 February 2026

Through a dynamic ligand exchange strategy, the chiral R/S-MPEA molecule replaces the original ligands on the surface of CsPbBr3 NCs. The coordination interaction between the amine group and the encapsulated Pb<sup>2+</sup> ions forms an asymmetric surface microenvironment. This interaction transfers molecular chirality to the inorganic lattice through electronic coupling and lattice strain, thereby endowing the NCs with chiral optical activity.

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Full Access | Helical Chiral MR-TADF Emitters Enabling Blue Circularly Polarized OLEDs

Guohui Xing, Haiwei Xia, Jiahao Xu, Xinwen Zhang, Yun Ma, Qiang Zhao

10/2026 | First Published: 15 February 2026

Sterically induced intrinsic helical MR-TADF emitters were delivered using N-phenylcarbazole, bisoxazolones, and dicyclopentadiene donors. The emitters enabled deep blue OLED emission (468–477 nm) with intramolecular CTs (E<sub>CT</sub> [E<sub>g</sub>]) = 10<sup>3</sup> and up to 15% IQE, indicating the efficacy of this molecular strategy.

Abstract | Full text | PDF | References | Request permissions

Open Access | PeaSAN: A Machine Learning Method for Inverse Design Using Pearson Correlated Surrogate Annealing

Michael Beck, Blake A. Wilson, Vaishnavi Iyer, Yuheng Chen, Vladimir M. Shalaev, Sabre Kais, Alexander V. Kildishev, Brad Lackey, Alexandra Boltasseva

10/2026 | First Published: 18 February 2026

A machine learning-assisted surrogate design framework is introduced to overcome the curse of dimensionality in complex nanophotonic design problems. By leveraging Pearson-correlated surrogate annealing (PeaSAN) method within a generative latent space, rapid convergence toward optimal thermally-stable nanofabrication designs is achieved, enabling precise spectral matching and state-of-the-art efficiency without exhaustive electromagnetic simulations.

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Full Access | Mid-Infrared LEDs Based on Lattice-Mismatched Hybrid IV-VIII-V Heterojunctions

Jared E. Meyer, Brindana Rodriguez, Leland Nordin, Kunal Mulherjee

10/2026 | First Published: 16 February 2026

Hybrid PbSe/CsGa and PbSe/CsGaAs mid-infrared LEDs with strong room-temperature electroluminescence at 3.8 and 5.0 μm are demonstrated, despite large lattice mismatch. The output power and wall-plug efficiencies demonstrate the viability of N-VIII-V hybrid heterojunctions for sustainable mid-infrared emission applications.

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Full Access | Developing Excellent Thermo-Optical Properties in Bi/Ta Doped AgNbO3 Ceramics for Adaptive Thermal Management

Zhiyuan Zhao, Liping Tong, Xinyu Yang, Honghao Li, Hao Gong, Zhongqiang Wang, Xiao Zhou, Tongqiang Fan

10/2026 | First Published: 17 February 2026

This work develops an effective strategy for tailoring thermo-optical properties in AgNbO3-based ceramics. The AgNb0.20 (Ag<sub>0.20</sub>Bi<sub>0.05</sub>Nb<sub>0.75</sub>O<sub>3</sub>) with x = 2.0 exhibits exceptional adaptive performance, including high emittance variation (Δε = 0.298) and temperature-stable absolute plane (Δα = 0.046) across broad temperature ranges. DFT calculations reveal that Bi<sup>3+</sup>/Ta<sup>5+</sup> ion doping alters electronic structure and thermo-optical properties by modulating d<sub>z<sup>2</sup></sub>-orbital hybridization.

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