Quantum-dot (QD) light-emitting diodes (QLEDs) are hotly investigated due to their potential applications in low-cost, wide color gamut and flexible displays 1,2,3,4,5,6,7 the past decade

Electrically pumped lasing from hybrid organic???inorganic metal???halide perovskite semiconductors could lead to nonepitaxial diode lasers that are tunable throughout the visible and near???infrared spectrum; however, a viable laser diode architecture has not been demonstrated to date. Here, an important step toward this goal is achieved by demonstrating two distinct ???

Thermoelectrically Pumped Light-Emitting Diodes Operating above Unity Efficiency The MIT Faculty has made this article openly available. Please share how this access benefits you. Your story matters. Citation: Santhanam, Parthiban, Dodd Gray, and Rajeev Ram. "Thermoelectrically Pumped Light-Emitting Diodes Operating Above Unity Efficiency."

LASERS PHOTOVOLTAICS AND THERMOELECTRICALLY-PUMPED LIGHT EMITTING DIODES

Due to these features, perovskites found large application in photovoltaic cells [6,9], light-emitting diodes [10][11][12], and optically pumped lasers [13][14][15]. For these devices, the study

We have proposed what we believe is a novel organic device pumped by an organic light-emitting diode to avoid a strong charge-induced absorption and nonradiative loss in an electrically pumped organic laser. An organic light-emitting diode was fabricated on the transparent anode substrate with a microcavity structure and driven under intense

We present a strategy for optimization of thermo-electric pumping in light emitting diodes (LEDs). We use a finite element model for charge transport in a GaInAsSb/GaSb double hetero-junction LED that is verified experimentally to consider optimal design and operation of low-bias LEDs. The wall-plug efficiency is shown to be enhanced by over 200x at nanowatt ???

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Surface emission spectrum from OLED-pumped organic films for different organic films: DCM2 (open squares), Py597 (open diamonds), Py580 (open circles), and mixed film of DCM2 and Py580 (line).

Semiconducting polymers are very promising optoelectronic materials enabling the simple fabrication of devices such as light-emitting diodes, lasers and solar cells. However, the development of polymer lasers has been hampered by the low charge mobility of these materials preventing electrically driven lasers. We find that this problem can be overcome by taking ???

For the case of optical pumping, the density of pumped exciton (N th) is deduced from the equation N th = 0.5 P th /[z(hc/?>>)] 34, where 0.5 is the transmittance of the pump laser to the top

LASERS PHOTOVOLTAICS AND THERMOELECTRICALLY-PUMPED LIGHT EMITTING DIODES

A heated semiconductor light-emitting diode at low forward bias voltage V<k B T/q is shown to use electrical work to pump heat from the lattice to the photon field. Here the rates of both radiative and nonradiative recombination have contributions at linear order in V. As a result the device's wall-plug (i.e., power conversion) efficiency is inversely proportional to its output ???

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We shall start with the definition of electroluminescence. Electroluminescence is the emission of light when a current passes through a semiconductor device and the injected non-equilibrium electrons and holes recombine across the bandgap or via localized levels within the bandgap. Electroluminescence has a much smaller spectral linewidth compared to thermal ???

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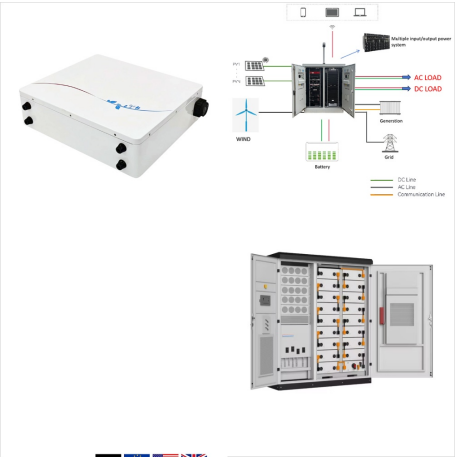
Organic-inorganic perovskites have become a focal point in research related to photovoltaics, light-emitting diodes, lasers, to create electrically pumped semiconductor lasers [62, 63]. Xing

Hybrid organic???inorganic halide perovskite semiconductors are presently being explored for application in light emitting diodes (LEDs) and lasers because they combine high color purity with a

LASERS PHOTOVOLTAICS AND THERMOELECTRICALLY-PUMPED LIGHT EMITTING DIODES

Data are presented on a monolithic chip that integrates a quantum well semiconductor laser with a high efficiency light emitting diode (LED), with the LED used to optically pump the laser. The LED operates in the thermoelectrophotonic regime that can produce heat absorption, offering the possibility of heat pump action. The internal optical pumping also offers the possibility of very ???

? Solution-processed metal halide perovskite (MHP) materials have been rapidly progressed in photovoltaic devices and light-emitting diodes. 7 The corresponding device fabrication techniques have been fully developed, mainly based on low-carbon footprint approaches such as spin coating, 8, 9 doctor blading, 10 and ink printing. 11 Based on these



For a typical diode laser emitting 3 mW at 780 nm, the emission wavelength will shift an average of 0.26 nm/?C and the threshold current will shift an average of 0.3 mA/???. For a typical telecom DFB laser operating at 1550 nm and 20 mW, the emission wavelength will shift an average of 0.11 nm/??? and the threshold current will change an

LASERS PHOTOVOLTAICS AND THERMOELECTRICALLY-PUMPED LIGHT EMITTING DIODES

Perovskite light-emitting diodes (LEDs) have attracted broad attention due to their rapidly increasing external quantum efficiencies (EQEs) 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15.However, most high

Experimental demonstration of net electro-luminescent cooling in a diode, or equivalently electroluminescence with wall-plug efficiency greater than unity, had eluded direct observation for more than five decades. We review experiments demonstrating light emission from a light-emitting diode in which the electron population is pumped by a combination of electrical ???

This Review discusses recent developments in photovoltaic and light-emitting optoelectronic devices made from metal-halide perovskite materials. Metal-halide perovskites are crystalline materials

LASERS PHOTOVOLTAICS AND THERMOELECTRICALLY-PUMPED LIGHT EMITTING DIODES

State Key Laboratory of Photovoltaic Science and Technology, Shanghai Frontiers Science Research Base of Intelligent Optoelectronics and Perception, Institute of Optoelectronics, Fudan University, Shanghai, 200433 China have seen extensive application in the field of light-emitting diodes (LEDs), where research is as abundant as the

? Solution-processed metal halide perovskite (MHP) materials have been rapidly progressed in photovoltaic devices and light-emitting diodes. 7 The corresponding device ???

We demonstrate indirect electrically pumped lasing in a hybrid polymer laser. The lasers comprise a corrugated fluorene copolymer waveguide on an InGaN light-emitting diode and were driven under nanosecond pulsed operation. We observe the onset of distributed feedback lasing at 568nm for peak drive currents above 144A. Angle-resolved photoluminescence ???