Solar Energy

Laser crystal solar container efficiency test

Overview

A team of researchers from the National Institute of Standards and Technology (NIST) in the United States has created a laser-based instrument that simulates sunlight in order to test solar cell properties and further improve their efficiency. Abstract—Uniform side-pumping can reduce the thermal stress of laser crystal rod and is an effective method to achieve high power laser output. In order to realize the uniform side-pumping of the laser crystal rod, a solar concentrating system based on plane mirrors and linear Fresnel lens array is. NLR maintains a chart of the highest confirmed conversion efficiencies for research cells for a range of photovoltaic technologies, plotted from 1976 to the present. Learn how NLR can help your team with certified efficiency measurements. Access our research-cell efficiency data. DOWNLOAD CHART Or. What is a standard test for photovoltaic non-concentrator system performance?

One popular test is ASTM 2848-13"Standard Test Method for Reporting Photovoltaic Non-Concentrator System Performance". The goal of this test is to compare the ratio of a modeled system vs the actual system performance,and. A team of researchers from the National Institute of Standards and Technology (NIST) in the United States has created a laser-based instrument that simulates sunlight in order to test solar cell properties and further improve their efficiency. The new simulator, as described in a paper published in.

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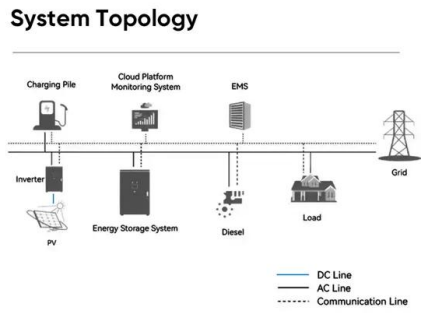

High-efficiency and economical solar-energy-pumped laser with ...

The authors achieved 11%-14% slope efficiency of solar-pumped laser by Cr-codoped Nd:yttrium aluminum garnet ceramic and Fresnel lens focusing from natural sunl

Efficient 38.8 W/m2 solar pumped laser with a Ce:Nd:YAG crystal and ...

Herein, we report a significant improvement in solar-pumped laser collection efficiency based on end-side pumping a 6-mm-diameter 95-mm-length Ce:Nd:YAG/YAG grooved bonded crystal rod. A ...

Pulsed laser ejection of single-crystalline III-V solar cells from GaAs

We compare our prototype, laser-ejected solar cells to specimens produced at the National Renewable Energy Laboratory (NREL) from mature fabrication processes and comparable ...

Solar dual-end-pumped single crystal fiber laser with conical reflector

To enhance the output power and solar-laser conversion efficiency of a solar-pumped single

crystal fiber (SCF) laser, we propose a dual-end-pumped configuration based on a hollow conical reflector. The ...

Review of Laser Doping and its Applications in Silicon Solar Cells

In the push to higher efficiency industrial silicon solar cells, laser doping has been a particularly important application of laser technology that enables the formation of localized heav-ily

AppSolEn2360133Qi

The simulation shows that sunlight can be uniformly distributed on the laser crystal surface (66.5% of con-centration efficiency and 98.5% of uniformity), which can provide a design of a solar ...

High-efficiency solar laser pumping by a modified ring-array

Abstract To considerably improve solar laser efficiency, a 5.5 mm diameter 20 mm length Nd:YAG single-crystal rod can be efficiently pumped by highly concentrated solar radiation through a ...

Laser processing for high-efficiency silicon solar cells

Download Citation , Laser processing for high-efficiency silicon solar cells , The main goal in PV research is a significant reduction of Watt-peak costs of PV systems and thus of solar cells

PHOTOVOLTAICS: Laser processing yields solar cells with 22% efficiency

A wet chemical-etching step removes silicon crystal damage (due to laser ablation) that can reduce carrier lifetime, resulting in a highly efficient solar cell with greater than 22% conversion efficiency. ...

A thermotropic liquid crystal enables efficient and stable perovskite

Retaining high performance of perovskite solar cells over large areas is a challenge. Yang et al. use a thermotropic liquid crystal with high diffusivity that does not co-crystallize with the

(PDF) Efficient 38.8 W/m solar pumped laser with a Ce:Nd:YAG ...

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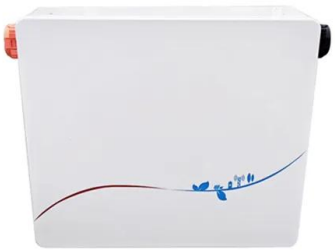
Highly efficient solar-pumped Nd:YAG laser

Here we show a big advance in solar laser collection efficiency by utilizing an economical Fresnel lens and a most widely used Nd:YAG single-crystal rod. The incoming solar radiation from ...

A solar-pumped Nd:YAG laser in the high collection efficiency regime

Abstract Solar-pumped lasers can be used for space and terrestrial applications. We report on solar side-pumped Nd:YAG laser experiments, which included comprehensive beam quality ...



Research on Key Technologies for Container Ship Loading Test ...

_. Traditional accuracy check methods for cargo hold in container ships rely solely on manual and visual operations, which are time-consuming and resource-intensive. Addressing the ...

Four-Ce:Nd:YAG-rod solar laser with 4.49% conversion ...

This paper presents the outcomes of the assessment of a solar laser prototype performed in the focal zone of a Fresnel lens, where it successfully emitted four laser beams at the same time.

Theoretical analysis of a 60 W solar-pumped single crystal fiber laser

In order to improve the output power of solar-pumped single-crystal fiber (SCF) lasers, we propose a novel solar concentrating system, to the best of our knowledge, consisting of a ...

Efficient 38.8 W/m2 solar pumped laser with a Ce:Nd:YAG crystal and ...

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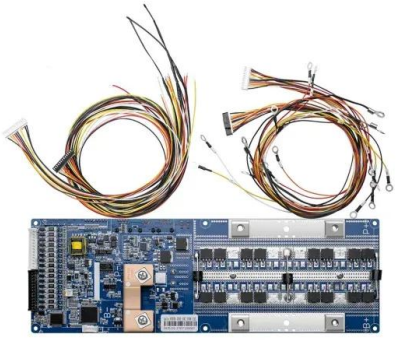

Lowest threshold solar-pumped Ce:Nd:YAG laser with 2.06% solar-to ...

Notably, 1.41 W TEM 00 mode solar laser power was also measured by adopting an asymmetric laser resonant cavity, resulting in 2.06% solar-to-TEM00 mode laser conversion ...

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To enhance the output power and solar-laser conversion efficiency of a solar-pumped single crystal fiber (SCF) laser, we propose a dual-end-pumped configuration based on a hollow ...

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