Are there any requirements for the photoelectric conversion module



Overview

WO2023132136A1 However, the conventional structure is not sufficient to block oxygen, and an improvement in the durability of the photoelectric conversion.

Key Takeaways

Photoelectric conversion modules require controlled environmental conditions, proper sealing, and compatible light exposure to ensure efficient and durable operation.

Environmental Conditions

Photoelectric conversion modules, especially those using perovskite or organic semiconductor layers, are sensitive to moisture and oxygen. Exposure to water vapor can react with perovskite compounds, forming non-conductive substances such as lead iodide or hydrated compounds, which reduce power generation efficiency. Oxygen under light irradiation can also react with cations in the perovskite layer, forming metal oxides or hydroxides that degrade performance.

Therefore, modules should be used in low-humidity environments or be properly sealed to prevent contact with air and moisture.

Sealing and Structural Requirements



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To improve durability, photoelectric conversion modules are typically sealed with materials such as polyvinyl alcohol, ethylene-vinyl alcohol copolymer, or butylene diol-vinyl alcohol copolymer. The sealing layer protects the photoelectric conversion element from environmental degradation and ensures stable operation over time. Proper sealing is critical for modules exposed to outdoor conditions or variable climates.

Light and Operational Conditions

Photoelectric conversion modules are designed to convert light into electricity efficiently. The intensity and spectrum of light should match the module's design. For example, perovskite solar cells and photodiodes are optimized for broad-spectrum sunlight, while photonic power converters may be tuned for narrow-band or laser light.

Modules should avoid prolonged exposure to extremely high illuminance without proper thermal management, as this can reduce output or damage the layers.

Material and Layer Considerations

Modules include a photoelectric conversion element composed of a first electrode, a photoelectric conversion layer (such as perovskite), a hole-transporting layer, and a second electrode. The hole-transporting layer often contains organic cations or halogen-containing polymers to improve thermal and humidity resistance. Ensuring that these materials are compatible with the operating environment is essential for maintaining efficiency and preventing degradation.

Summary of Key Conditions

Humidity control: Avoid water exposure; use sealed modules. Oxygen exposure: Minimize contact with air to prevent oxidation. Light intensity: Operate within the designed illumination range.

Temperature: Avoid extreme heat; ensure thermal stability of materials. Sealing integrity: Use appropriate sealing materials to protect the module. Material compatibility: Ensure electrodes, transport layers, and perovskite layers are stable under operational conditions.

By adhering to these conditions, photoelectric conversion modules can maintain high efficiency and long-term durability in applications such as solar energy harvesting, photodetectors, and IoT devices.

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Article Content

WO2023132136A1

However, the conventional structure is not sufficient to block oxygen, and an improvement in the durability of the photoelectric conversion module has been demanded. An object of the present...

WO/2026/083160 PHOTOELECTRIC CONVERSION MODULE,

A photoelectric conversion module including a substrate, a plurality of photoelectric conversion elements on the substrate, and a high resistance layer. The plurality of photoelectric

EP4528827A1

Hence, it is an object of the present invention to provide a photoelectric conversion module having a bypass diode function without losing flexibility.

Photoelectric conversion module

The photoelectric conversion module 100 may include a photoelectric conversion element 10, a sealing layer 400 that seals the photoelectric conversion element 10, and a transparent substrate 600

WO/2024/122182 PHOTOELECTRIC CONVERSION MODULE

The purpose of the present invention is to provide a photoelectric conversion module that has a bypass diode function and that will not lose flexibility.

PHOTOELECTRIC CONVERSION DEVICE, ELECTRONIC DEVICE,

In particular, a flexible photoelectric conversion device is expected to have a high efficiency and to be able to follow various situations; thus, it is expected to be suitably applicable for

PHOTOELECTRIC CONVERSION MODULE, ELECTRONIC

To achieve such an IoT society, a large number of sensors are required to be coupled to various things to obtain data, but power supplies that drive such a large number of sensors are needed.

Mandatory Characteristics and Parameters of Photoelectric Systems ...

In this work, mandatory characteristics and parameters of photoelectric systems and system''s PV components have been considered that have to be specified by manufacturer in

U.S. Patent Application for PHOTOELECTRIC CONVERSION

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However, although examples having high photoelectric conversion efficiency have been reported for photoelectric conversion element modules according to conventional techniques, there is still room

PHOTOELECTRIC CONVERSION MODULE, ELECTRONIC

To increase the output of this photoelectric conversion element, a module structure may be used where a plurality of photoelectric conversion elements are produced on the same substrate and are coupled

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Photoelectric Conversion Module: A Comprehensive Review

A photoelectric conversion module converts light into electrical signals using a photodiode or APD, amplifying the current into a voltage. It is essential in optical communication, laser detection, and

Chapter 11: Onboard Systems

Photovoltaics As the term suggests, photovoltaic materials have the ability to convert light directly to electricity. An energy conversion efficiency of about 29 percent was achieved in July 2000,

High Photoelectric Conversion Efficiency of Metal Phthalocyanine

This paper introduces the fundamental physical characteristics of organic photovoltaic (OPV) devices. Photoelectric conversion efficiency is crucial to the evaluation of quality in OPV

Photoelectric conversion element, photoelectric conversion module ...

The present disclosure relates to a photoelectric conversion element, a photoelectric conversion module, an electronic device, and a power supply module.

Photovoltaic system

The power that one module can produce is seldom enough to meet requirements of a home or a business, so the modules are linked together to form an array. Most

Mandatory Characteristics and Parameters of Photoelectric Systems ...

Adequate evaluation of photoelectric systems, photoelectric arrays and photoelectric modules in conditions they are supposed to be operated is one of the most essential problems of

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Photovoltaics and electricity

PV system efficiency The efficiency that PV cells convert sunlight to electricity varies by the type of semiconductor material and PV cell technology. The efficiency of commercially available PV panels

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