

Mercury cadmium telluride photovoltaic





Overview

What are cadmium mercury telluride photovoltaic infrared detectors?

In the field of infrared remote sensing, cadmium mercury telluride photovoltaic infrared detectors play a crucial role in the performance of the entire infrared camera optical system. HgCdTe photovoltaic detectors have the advantages of high quantum efficiency and low dark current.

What is a mercury cadmium telluride detector?

Mercury cadmium telluride ($\text{Hg}_{1-x}\text{Cd}_x\text{Te}$, x is the material component) detectors, which came into being with the invention of HgCdTe materials, are now technologically well developed, high performance detectors and occupy a central position in aerospace infrared remote sensing applications.

Why is cadmium telluride used in infrared detectors?

Mercury cadmium telluride enabled the preparation of two-colour infrared detectors in the 1970s [36, 37] The preparation of multi-colour infrared detectors, which require a ring-hole process and multilayer epitaxy, is complex and the duty cycle and quantum efficiency of the photosensitive elements limit the development of large-scale applications.

What are the advantages of photovoltaic HgCdTe photodiodes?

Advantages of Photovoltaic HgCdTe: Unlike the photoconductors commonly used in the 500nm to 5.0um region, HgCdTe photodiodes operate in the photovoltaic mode and do not require a bias current for operation.

What is HgCdTe photovoltaic detector?

HgCdTe photovoltaic detectors have high output impedance, low power consumption and good impedance matching with CMOS readout circuits, and have wide application prospects in space remote sensing, laser detection, agricultural detection, hyperspectral imaging, and military fields.



Does HgCdTe avalanche photodiode ionize at 8 μm cut-off?

Kopytko, M. et al. Impact ionization in HgCdTe avalanche photodiode optimized to 8 μm cut-off wavelength at 230 K. *Infrared Phys. Techn.* 115, 103704 (2021). Li, Q. et al. Enhanced performance of HgCdTe midwavelength infrared electron avalanche photodetectors with guard ring designs.



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Mercury telluride colloidal quantum-dot focal plane array

Currently, dominant infrared materials are bulk semiconductors such as mercury cadmium telluride (HgCdTe) (6, 7), indium gallium arsenide (InGaAs) (8, 9), and indium antimonide (InSb) (10, 11), and alternatives such as quantum well (12, 13) and type II (14, 15).

Mercury Cadmium Telluride Photodiodes at the Beginning of the ...

Mercury cadmium telluride (HgCdTe) ternary alloy system maintains its privileged position in IR detector technology. In this paper, the recent progress in HgCdTe photovoltaic detectors is described from the historical point of view.



High-performance HgCdTe avalanche photodetector enabled with

Introduction. Mid-wavelength infrared (MWIR), one of three transparent atmospheric windows, has a unique advantage in full-time and all-weather space-to-ground ...

Comprehensive study of physical properties of cadmium telluride ...

Cadmium telluride (CdTe) is an essential compound semiconductor belonging to the II-VI group. It is the most competitive and leading photovoltaic material for thin-film solar cells due to its ideal direct band gap of 1.45-1.6 eV at



room temperature and higher 4 cm

High Voltage Solar Battery



Designers still choose mercury cadmium telluride

During the past three decades mercury cadmium telluride ($Hg_{1-x}Cd_xTe$) has been the most important semiconductor for mid- and long-wavelength ($\lambda = 3-30 \mu m$) infrared photodetectors. After silicon and gallium ...



Comprehensive Review on CdTe Crystals: Growth, Properties, ...

4.1 Basic Structure Cadmium telluride has a relatively high atomic number compared to the other elemental photovoltaic material silicon (Cd--48, Te--52, and Si--14). The valance electronic configuration of cadmium (Cd) and tellurium (Te) atoms are, $4d 10 5s 2$ and $4d 10 5s 2 5p 4$, respectively., respectively.



Current transport mechanisms in mercury cadmium telluride diode

This paper reports the results of modelling of the current-voltage characteristics (I-V) of a planar mid-wave Mercury Cadmium Telluride photodiode in a gate controlled diode ...





Perspectives on the pathways for cadmium telluride photovoltaic ...

Perspectives on the pathways for cadmium telluride photovoltaic module manufacturers to address expected increases in the price for tellurium Author links open overlay panel Michael Woodhouse a, Alan Goodrich a, Robert Margolis a, Ted James a, Ramesh Dhere c, Tim Gessert c, Teresa Barnes c, Roderick Eggert b, David Albin c



Mercury cadmium-telluride photodiodes and focal plane arrays

Single element mercury cadmium telluride (MCT) LWIR and MWIR photodiodes have been investigated. High speed up to 1 GHz heterodyne mode detectors are included. Topology and technology features of 32 X 32, 128 X 128, 384 X 288, 4 X 16, 4 X 16, 4 X 48, 2 X 96, 4 X 128, 2 X 256 LWIR and MWIR focal plane arrays (FPA) produced on the base of MCT ...

Mercury Cadmium Telluride : Growth, Properties and Applications

Mercury Cadmium Telluride: Growth, Properties and Applications provides both an introduction for newcomers, and a comprehensive review of this fascinating material. Part One discusses the history and current status of both bulk and epitaxial growth techniques, Part Two is concerned with the wide range of properties of MCT, and Part Three covers the various device types that ...



Photovoltaic Mercury Cadmium Telluride Detectors

Advantages of Photovoltaic HgCdTe: Unlike the photoconductors commonly used in the 500nm to 5.0um region, HgCdTe photodiodes operate in the photovoltaic mode and do not require a bias current for operation.



Wet chemical etching of cadmium telluride photovoltaics for enhanced

Cadmium telluride (CdTe) is one of the leading photovoltaic technologies with a market share of around 5%. However, there still exist challenges to fabricate a rear contact for efficient transport of photogenerated holes. Here, etching effects of various iodine compounds including elemental iodine (I₂), ammonium iodide (NH₄I), mixture of elemental iodine and NH₄I ...



Photoconductive and Photovoltaic IR Detectors , SpringerLink

Narrow-gap mercury-cadmium-telluride technologies are well developed now, and today this material is one of the basic semiconductors for photon detectors from near IR (wavelength ? ~ 1.5 um) to long IR (? ~ 20 um) and is used in large-scale arrays with silicon CMOS readouts.

Multi-Physics Field Based Simulation on the Resonse and ...

In recent years, there has been a growing interest in photovoltaic detectors based on mercury cadmium telluride (Hg_{1-x}Cd_xTe), owing to their exceptional photoel





Mercury Cadmium Telluride

Mercury Cadmium Telluride delivers a comprehensive treatment of both the growth techniques and fundamental properties of mercury cadmium telluride (MCT). It also presents information on the current developments in the use of this important material and includes contributions from many of the key groups working in the area from several countries, giving it a wide, ...

HgCdTe (MCT) Amplified Photodetectors

Thorlabs' Amplified HgCdTe (mercury cadmium telluride, MCT) Photovoltaic Detectors are sensitive to MIR light. A rotary switch controls the gain amplifier (shown in the ...



Photovoltaic Mercury Cadmium Telluride Detectors

TELEDYNE JUDSON TECHNOLOGIES A Teledyne Technologies Company 1/6 Teledyne Judson Technologies LLC 221 Commerce Drive Montgomeryville, PA 18936 USA Tel: 215-368-6900 Fax: 215-362-6107 Visit us on the web.

Modeling Mercury Cadmium Telluride (HgCdTe) Photodiodes

Mercury cadmium telluride (HgCdTe) infrared detectors have been intensively developed over the past 40years since the first of photovoltaic detectors, is now in high-rate production--thousands of arrays are created annually. Third-generation devices two-color





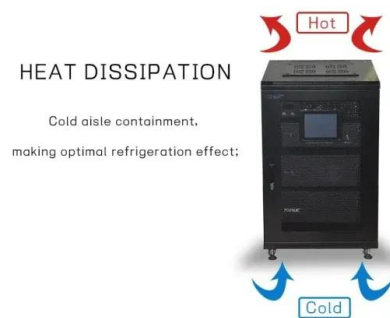
Modelling of illuminated current-voltage characteristics to ...

The current-voltage characteristics of long wavelength mercury cadmium telluride infrared detectors have been studied using a recently suggested method for modelling ...



Mercury Cadmium Telluride (HgCdTe) Detectors for Infrared ...

Mercury Cadmium Telluride (HgCdTe, MCT) detectors are widely customizable, with a tunable sensitivity range between 2 μm and 26 μm . Two varied sensing modes are also offered. The first mode is the photovoltaic mode, which is mainly applicable to MWIR



Status and Progress of Research on HgCdTe Photovoltaic

Photovoltaic Infrared Detectors Chen Xin(B), Chen Yong, Lv Wei Dong, Zhang Jiu Shuang, and Chen Lei Beijing Institute of Space Mechanics & Electricity, Beijing 100094, China 920353389@qq Abstract. In the field of infrared remote sensing, cadmium



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Modelling of illuminated current-voltage characteristics to ...

The current-voltage characteristics of long wavelength mercury cadmium telluride infrared detectors have been studied using a recently suggested method for mode Vishnu Gopal, WeiCheng Qiu, Weida Hu; Modelling of illuminated current-voltage characteristics to evaluate leakage currents in long wavelength infrared mercury cadmium telluride photovoltaic ...





Photovoltaic Mercury Cadmium Telluride Detectors

Photovoltaic Mercury Cadmium Telluride Short Form Catalog in PDF Format J19TE Series Photovoltaic MCT Detectors J19TE series detectors are high-quality HgCdTe photodiodes for use in the 500nm to 5.0um range. The equivalent circuit is a photon

Mercury Cadmium Telluride , Wiley Online Books

Mercury cadmium telluride (MCT) is the third most well-regarded semiconductor after silicon and gallium arsenide and is the material of choice for use in infrared sensing and imaging. The reason for this is that MCT can be 'tuned' to the desired IR wavelength by varying the cadmium concentration. Mercury Cadmium Telluride: Growth, Properties and Applications provides both ...



Progress in bulk cadmium mercury telluride over the last 25 years

It is ~50 years now since the first development of the ternary compound cadmium mercury telluride (MCT) in bulk crystal form for infrared (IR) applications. MCT (Cd x Hg1-x Te) is still the pre-eminent infrared material, and by varying the x value the material can be made to cover all the important IR ranges of interest (i.e. 1-3, 3-5 and 8-14 um). The first half ...



High-performance HgCdTe avalanche photodetector enabled with

Baker, I. M., Finger, G. & Barnes, K. Mercury cadmium telluride focal plane array developments at Selex ES for astronomy and spectroscopy. In Proc. 40th Conference on Infrared Technology and



High-Performance HgCdTe Photovoltaic IR Detectors ...

MCT detector is an infrared detector with tunable bandgap in which the detection structure is made of mercury, cadmium and telluride, also known as the HgCdTe detector. It is a semiconductor electro-optical device that converts infrared ...

Mercury Cadmium Telluride

Mercury cadmium telluride : growth, properties, and applications / Peter Capper and James Garland. p. cm. Includes bibliographical references and index. ISBN 978-0-470-69706-1 (cloth) 1. Mercury cadmium tellurides. 2. Semiconductors - Doping. 3. Infrared



Cadmium telluride

See Cadmium telluride photovoltaics for more information. Another study shows that CdTe PV recycling will add a significant secondary resource of Te which, in conjunction with improved material utilization, will enable a cumulative capacity of about 2 TW by 2050 and 10 TW by the end of the century.



Infrared Detectors

Tellurium-based compounds such as cadmium telluride (CdTe) and mercury cadmium telluride (HgCdTe) have been used as infrared (IR) detectors for over half a century. These versatile narrow gap semiconducting materials are ...



[PDF] Modelling of illuminated current-voltage characteristics to

The current-voltage characteristics of long wavelength mercury cadmium telluride infrared detectors have been studied using a recently suggested method for modelling of illuminated photovoltaic detectors. Diodes fabricated on in-house grown arsenic and vacancy doped epitaxial layers were evaluated for their leakage currents. The thermal diffusion, ...

[PDF] Modelling of illuminated current-voltage characteristics to

The current-voltage characteristics of long wavelength mercury cadmium telluride infrared detectors have been studied using a recently suggested method for modelling of illuminated ...



Current transport mechanisms in mercury cadmium telluride diode

Modelling of illuminated current-voltage characteristics to evaluate leakage currents in long wavelength infrared mercury cadmium telluride photovoltaic detectors J. Appl. Phys. (November 2014) A new approach to investigate leakage current mechanisms in infrared photodiodes from illuminated current-voltage characteristics



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