Antimony application in solar cells

Earth-abundant and environmentally benign antimony selenide (Sb2Se3) has emerged as a promising light-harvesting absorber for thin-film photovoltaic (PV) devices due to its high absorption coefficient, nearly ideal bandgap for PV applications, excellent long-term stability, and intrinsically benign boundaries if properly aligned on the substrate. The record ...

Sb 2 X 3 solar cells are efficient in recycling indoor and ambient light; thus, they are promising as indoor PVs (IPVs). Sb 2 X 3 PVs exhibit potential to simultaneously solve the stability and toxicity issues faced by lead ...

CZTS is the most promising but less studied compound as compared to other compounds for solar cell application. ... Antimony sulfide solar cells have demonstrated an efficiency exceeding 7% when ...

Antimony selenide is a promising thin film solar cell absorber material in which grain orientation is crucial for high device performance. Here Li et al. grow the material in nanorod arrays along ...

Mixed bismuth-antimony-based double perovskite nanocrystals for solar cell application ... The synthesized NCs are lead free and can be use for 3rd generation solar cell applications. The ...

Abstract Although antimony selenoiodide (SbSeI) exhibits a suitable bandgap as well as interesting physicochemical properties, it has not been applied to solar cells. ... they can be used in various applications, such ...

Antimony selenide (Sb2Se3) is a promising low-cost photovoltaic material with a 1D crystal structure. The grain orientation and defect passivation play a critical role in determining the performance of polycrystalline Sb2Se3 thin-film solar cells. Here, a seed layer is introduced on a molybdenum (Mo) substrate to template the growth of a vertically oriented, ...

Antimony selenide (Sb2Se3) is a promising photovoltaic thin-film absorber material that has been widely studied in recent years. In Sb2Se3 thin-film solar cells, cadmium sulfide (CdS) is generally used for the fabrication of electron collection layers because of its high electron affinity, electronic mobility, and environmental stability. This study demonstrates the ...

Request PDF | Antimony sulphide, an absorber layer for solar cell application | Replacement of the toxic, expensive and scarce materials with nontoxic, cheap and earth-abundant one, in solar cell ...

Two-micrometre-thin antimony sulphide film is considered to be adequate as an absorbing layer in solar cell applications. In this paper, we synthesize antimony sulphide ...

Mixed bismuth-antimony-based double perovskite nanocrystals for solar cell application. Ashish Kumar, Ashish Kumar. CSIR-National Physical Laboratory, New Delhi, India ... density-voltage characteristics of the

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Cs 2 AgBi 0.6 Sb 0.4 Br 6 NCs device has been studied to ascertain its utility in solar cells. The device is fabricated using nickel ...

The J-V curves of solar cells were measured with forward scan under AM1.5 illumination (100 mW/cm 2) from a 94023 A Oriel ® Sol3A solar simulator (Newport), and the light intensity from a 450 W ...

Fluorene-based hole transport materials (HTMs) with terminating thiophene units are explored, for the first time, for antimony sulfide (Sb2S3) solar cells. These HTMs possess largely simplified synthesis processes and high yields compared to the conventional expensive hole conductors making them reasonably economical. The thiophene unit-linked HTMs have been successfully ...

Due to their promising applications in low-cost, flexible and high-efficiency photovoltaics, there has been a booming exploration of thin-film solar cells using new absorber materials such as Sb 2 Se 3, SnS, FeS 2, CuSbS 2 and CuSbSe 2.Among them, Sb 2 Se 3-based solar cells are a viable prospect because of their suitable band gap, high absorption ...

DOI: 10.1002/SOLR.201900026 Corpus ID: 140901527; Review of Recent Progress in Antimony Chalcogenide-Based Solar Cells: Materials and Devices @article{Lei2019ReviewOR, title={Review of Recent Progress in Antimony Chalcogenide-Based Solar Cells: Materials and Devices}, author={Hongwei Lei and Jianjun Chen and Zuojun Tan and Guojia Fang}, ...

Although antimony sulfoiodide (SbSI) exhibits very interesting properties including high photoconductivity, ferroelectricity, and piezoelectricity, it is not applied to solar cells. Meanwhile, SbSI is predominantly prepared as a powder using a high-temperature, high-pressure system. Herein, the fabrication of solar cells utilizing SbSI as light harvesters is ...

We show that hydrothermal synthesis affords good morphology and reduced defects in antimony selenosulfide films, enabling solar cells with an efficiency of 10%.

Antimony chalcogenides such as Sb 2 S 3, Sb 2 Se 3, and Sb 2 (S x Se 1-x) 3 have emerged as very promising alternative solar absorber materials due to their high stability, abundant elemental storage, nontoxicity, low-cost, suitable tunable bandgap, and high absorption coefficient. Remarkable achievements have been made in antimony chalcogenide solar cells ...

The unique properties of perovskites and the rapid advances that have been made in solar cell performance have facilitated their integration into a broad range of practical applications, including ...

Benefiting from previous investigation in thin film solar cells and new generation nanostructured solar cells, this class of materials has been applied in either sensitized ...

The copper-based solar cell shows high potential as a material for low cost and non-toxic solar cells, which is

an advantage compared to the Pb or Cd based cells. 110 In 2018, Zang et al. utilized a perfectly oriented, micrometer grain-sized Cu 2 O/ZnO thin film to fabricate a solar cell with a PCE of 3.17%. 110 The combination of the two ...

An international research team has outlined a new design for solar cells based on antimony trisulfide (Sb 2 S 3) that can reportedly result in 30% higher efficiency compared to existing Sb 2 S 3 ...

Copper antimony sulphide thin films are promising, less toxic, and more absorbent material in the world, and they would be good to be applied in photovoltaic energy production. To better op-erations of copper antimony sulphide (CuSbS2) photovoltaic cells, this paper uses a solar cell

The rapidly expanding demand for photovoltaics (PVs) requires stable, quick, and easy to manufacture solar cells based on socioeconomically and ecologically viable earth-abundant resources. Sb2S3 has been a potential candidate for ...

However, the efficiency of these solar cells is merely in the range of 2%. To further improve solar cell performance we prepared mixed bismuth-antimony double perovskite Cs 2 AgBi 1-x Sb x Br 6 where different fractions of antimony (x=0.125, 0.25, 0.375, 0.50) are used. This was motivated by reports of lower bandgap values in these mixed system.

Recently, antimony chalcogenide solar cells including Sb2S3, Sb2Se3, and Sb2(S,Se)3 have obtained considerable progress, with efficiency up to 7.5%, 9.2%, and 7.82%, respectively, and the efficiency values are largely plagued by a severe open-circuit voltage deficit. In this Perspective, we conduct a detailed analysis of open-circuit voltage loss in antimony ...

Antimony chalcogenides such as Sb 2 S 3, Sb 2 Se 3, and Sb 2 (S x Se 1-x) 3 have emerged as very promising alternative solar absorber materials due to their high stability, abundant elemental storage, nontoxicity, low-cost, suitable tunable bandgap, and high absorption coefficient. Remarkable achievements have been made in antimony chalcogenide solar cells ...