SOLAR PRO.

Indium Phosphide Solar Cell Structure

Are in Dium phosphide window layers suitable for space power applications?

The high efficiency and better radiation performance of the solar cell structures based on InGaAs make them suitable for space power applications. This work investigates the suitabilityof in- dium phosphide (InP) window layers for lattice-matched In 0.53Ga 0.47As (bandgap energy 0.74 eV) solar cells.

Is indium gallium arsenide a good material for solar cells?

Indium gallium arsenide (In and related materials based solar cells are quite promisingfor photovoltaic and thermophotovoltaic applications. The flexibility of the change in the bandgap energy and the growth of InGaAs on different substrates make this material very attractive for multi-bandgap energy,multi-junction solar cell ap- proaches.

What is ITO/ZnO/I-INP solar cell?

As a proof-of-concept, we fabricated ITO/ZnO/i-InP solar cell on a p InP substrate and achieved an open-circuit voltage () and efficiency as high as 819 mV and 18.12%, respectively, along with ~90% internal quantum efficiency. The entire device fabrication process consists of four simple steps which are highly controllable and reproducible.

Do P-type phosphide window layers suit lattice-matched InGaAs solar cells?

This work investigates the suitability of in- dium phosphide (InP) window layers for lattice-matched In 0.53Ga 0.47As (bandgap energy 0.74 eV) solar cells. We present the first data on the effects of the p-type InP window layer on p-on-n lattice-matched InGaAs solar cells.

What is indium gallium arsenide?

Indium gallium arsenide (In xGa 1-xAs) material has been used widely in several state-of-the-art elec- tronic and optoelectronic devices. In xGa 1-xAs and related materials based solar cells are quite promis- ing for photovoltaic (PV) and thermophotovoltaic (TPV) applications .

Can InGaAs cells be used in multi-bandgap solar cells?

These developments were intended for the use of InGaAs cells in multi-bandgap energy, multi-junction solar cell approaches. Two-junction monolithic InP/InGaAs tandem cells grown on InP substrates have demonstrated AM0 1- sun efficiencies over 22% . Figure 1.

The current status of indium phosphide cell research is reviewed and state of the art efficiencies compared to those of GaAs and Si. It is shown that the radiation resistance of InP cells is ...

One of the promising materials for space solar cells is the III-V semiconductor indium phosphide, which has shown good performance in both homojunction and heterojunction structures. ...

Fabricating a pit array on the surface of indium phosphide wafer can change its photoelectric properties, improve its photoelectric conversion efficiency, and expand its ...

Comparison of np and pn Structures in Indium Phosphide Solar Cells. NASA Lewis Research . Center, USA, 1991. [13] Weinberg I. Radiation damage in InP solar cells.

structure [12]. Since InP solar cells are promising for space indium phosphide solar cells under space conditions, and (ii) model the effects of 1 MeV electron irradiation on InP solar cells. 2 Numerical modeling Numerical simulations of InP solar cells have been carried out by using the finite element method in order to

The layer structure of the new solar cell was developed back in 2016 together with the French company Soitec Inc., that designs and manufactures innovative semiconductor ...

Numerical simulation was used to compare the radiation resistance and the performances of n/p and p/n solar cell structures for an Indium Phosphide (InP) solar cell. It was noted that the optimum n/p solar cell structure was more ...

As a proof-of-concept, we fabricated ITO/ZnO/i-InP solar cell on a p + InP substrate and achieved an open-circuit voltage (Voc) and efficiency as high as 819 mV and ...

The current status of indium phosphide cell research is reviewed and state of the art efficiencies compared to those of GaAs and Si. It is shown that the radiation resistance of InP cells is superior to that of either GaAs or Si under 1 MeV electron and 10 MeV proton irradiation. Using lightweight blanket technology, a SEP array structure and projected cell efficiencies, array specific powers ...

According to the Shockley-Queisser limit, the maximum achievable efficiency for a single junction solar cell is ~33.2% which corresponds to a bandgap (E g) of 1.35 eV (InP).However, the maximum reported efficiency for InP solar cells remain at 24.2% ± 0.5%, that is >25% below the standard Shockley-Queisser limit.

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