Heterojunction battery without indium

Is indium a problem for heterojunction solar cells?
Nonetheless,the indium contained in ITO is a rare metal with limited reserves and mining capacity,resulting in higher production costs . This poses a significant hurdleto the future expansion of heterojunction solar cell industry.

How to reduce indium consumption in high efficiency silicon heterojunction (SHJ) solar cells?
Reducing indium consumption has received increasing attention in contact schemes of high efficiency silicon heterojunction (SHJ) solar cells. It is imperative to discover suitable,low-cost,and resource-abundant transparent electrodesto replace the conventional,resource-scarce indium-based transparent electrodes.

What is a silicon heterojunction device?
Silicon heterojunction devices rely on the use of thin-film silicon coatings on either side of the wafer to provide surface passivation and charge carrier-selectivity. Beyond traditional indium tin oxide, multiple higher-mobility indium-based transparent conductive oxides have been employed successfully in HJT cells.

How to avoid the use of indium in solar cells?
To avoid the use of indium,basic strategies include: (a) developing TCO-free SHJ solar cells; (b) using indium-free TCO materials such as aluminum-doped zinc oxide (AZO) ,,which has attracted much attention.

Is TTO a viable alternative to indium-based conductive oxides for SHJ solar cells?
PV parameters of SHJ solar cells with indium-free transparent conductive oxides in the previous published work. TTO as an alternative to indium-based TCO material,must have better sustainabilityfor future scale-up of indium-free SHJ solar cells. The host material SnO 2 of TTO is naturally abundant.

What causes low efficiency of indium-free SHJ solar cells?
One of the main causes for low efficiency of indium-free SHJ solar cells is the reduced fill factor(FF),which is closely related to the poor electrical properties of TCO and the large contact resistance between TCO and the adjacent n-type or p-type hydrogenated amorphous silicon (a-Si:H).

The absolute world record efficiency for silicon solar cells is now held by an heterojunction technology (HJT) device using a fully rear-contacted structure. This chapter reviews the recent research and industry developments which have enabled this technology to reach unprecedented performance and discusses challenges and opportunities for ...

Silicon heterojunction (SHJ) solar cells are recognized as one of the most efficient architectures in silicon-based photovoltaic devices. However, the reliance on indium (In)-based transparent conductive oxides (TCO) is anticipated to constrain their production capacity due to the critical and economically volatile nature of In. Recently, low ...

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A European research group led by Italy"s University of Catania has tested the use of zirconium (Zr)-doped indium oxide (In2O3) as a transparent conductive film in the silicon heterojunction...

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We fabricated silicon heterojunction back-contact solar cells using laser patterning, producing cells that exceeded 27% power-conversion efficiency.

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The invention discloses an indium-free heterojunction battery and a preparation method thereof. The preparation method comprises the following steps: respectively preparing intrinsic...

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