Ge single crystal solar cell substrate

Can a single-junction solar cell be grown directly on a spalled Ge substrate?
Here, we describe single-junction GaInAs solar cell devices grown by organometallic vapor phase epitaxy (OMVPE) directly on spalled Ge (hereafter referred to as "sp-Ge") substrates that undergo minimal surface processing, but no CMP, before growth.

What is the difference between GaAs and Ge substrates?
Ge substrates are commonly used instead of GaAs substrates for growth of III-V multijunction solar cells used for space applications. Controlled spalling of (100)-oriented Ge solves several issues associated with GaAs spalling, offering both alignment between a preferred growth orientation and an available cleavage system.

Which substrate is used for III-V multijunction solar cells?
However,(110) is not a common growth orientation for III-V photovoltaics,and it is difficult to maintain a smooth epitaxial growth front. Ge substratesare commonly used instead of GaAs substrates for growth of III-V multijunction solar cells used for space applications.

How efficient are single-junction solar cells on SP-GE?
We demonstrate a 23.4%efficient single-junction solar cell on sp-Ge under conditions where no spalling defects are present and without the use of a CMP step. These best devices are within 2% relative of nominally identical devices grown on commercial epi-ready Ge (hereafter referred to as "epi-Ge") substrates.

What is an epitaxially ready single-crystal GE membrane?
Here,we present an ultrathin single-crystal Ge membrane formed by germanium-on-nothing (GON) technologywhich employs morphological evolution of an arrayed porous Ge during hydrogen annealing.

How are solar cell structures deposited?
Solar cell structures were deposited on both commercial, epi-ready Ge wafers and the wafers that resulted from the controlled spalls on full 50.8 mm-diameter wafers. The Ge substrates were heated to 700 °C under hydrogen and held for 10 min for in situ oxide desorption.

Here, we describe single-junction GaInAs solar cell devices grown by organometallic vapor phase epitaxy (OMVPE) directly on spalled Ge (hereafter referred to as ...

costs originates from the expensive Ge and GaAs single-crystal wafers, which are used as substrates to epitaxially grow the III-V PV devices. To address this, epitaxial lift-off (ELO) and ...

N2 - Decreasing the cost of single-crystal substrates by wafer reuse techniques has long been sought for III-V solar cells. Controlled spalling of III-V devices is a possible pathway for ...

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These results demonstrate a CMP-free, reliable Ge substrate reconditioning process, paving the way towards substrate multi-reuse and consequent devices" weight and ...

sent an ultrathin epitaxially ready single-crystal Ge membrane, formed by germanium-on-nothing(GON)technology,whichemploysmorphologicalevolu- ... transfer of thin III-V solar cells ...

In the search for a hybrid III-V/Si photovoltaic technology, a tandem GaAsP/SiGe solar cell grown on silicon substrate have been developed using SiGe/Ge reverse graded buffers.

demonstrated single-junction GaAs solar cell efficiencies > 25% [4]. However, the cost of the single-crystal substrate used for device growth remains very high. One possible path to reduce ...

Ultrathin Ge single-junction (1J) solar cells transferred onto a flexible substrate are envisioned to open up a novel lattice-matched thin-film InGaP/(In)GaAs/Ge tandem solar ...

Ultrathin Ge single-junction (1J) solar cells transferred onto a flexible substrate are envisioned to open up a novel lattice-matched thin-film InGaP/(In)GaAs/Ge tandem solar cell for enabling highly efficient, low-cost, ...

efficient single-junction device, without anti-reflection coating, grown on a spalled surface containing arrest lines. The quantum efficiency of this device is similar to devices grown on ...

High efficiency III-V multijunction solar cells deposited on metal foil or even polymer substrates can provide tremendous advantages in mass and stowage, particularly for planetary missions. ...

Ultra-thin Ge single-junction (1J) solar cells transferred onto a flexible substrate are envisioned to open up a novel lattice-matched thin-film InGaP/(In)GaAs/Ge tandem solar ...

An improved growth technology was developed to grow Ge-rich SiGe crystals on Ge seeds on the basis of the Multi-component zone melting method. The purpose of growing ...

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Here, we describe single-junction GaInAs solar cell devices grown by organometallic vapor phase epitaxy (OMVPE) directly on spalled Ge (hereafter referred to as "sp-Ge") substrates that undergo minimal surface ...

In this paper, we consider the use of crystalline Ge as bottom cell and substrate for growth of high efficiency II-VI multijunction solar cells and amorphous Ge for application in thin film II-VI ...

an alternative substrate to Ge for realization of exactly lattice-matched GaAs/SiGe solar cells. The SiGe substrates were fabricated by the multicompo-nent zone-melting method developed by ...

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