

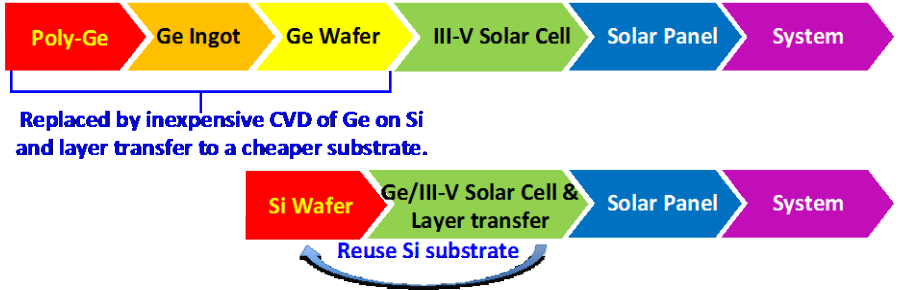
A High-Efficiency Low-Cost Manufacture of Multijunction Solar Cell



A joint India-U.S. research consortium funded under the *Joint Clean Energy Research & Development Center (JCERDC)*

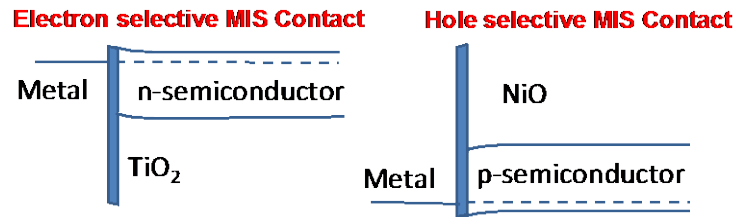
Scientific Achievement:

We propose disruptive multi-material solar cells with junctionless metal/insulator/semiconductor (MIS) carrier-selective contacts fabricated on a Si substrate with efficiencies approaching ~39% with substantially lower cost of manufacturing.



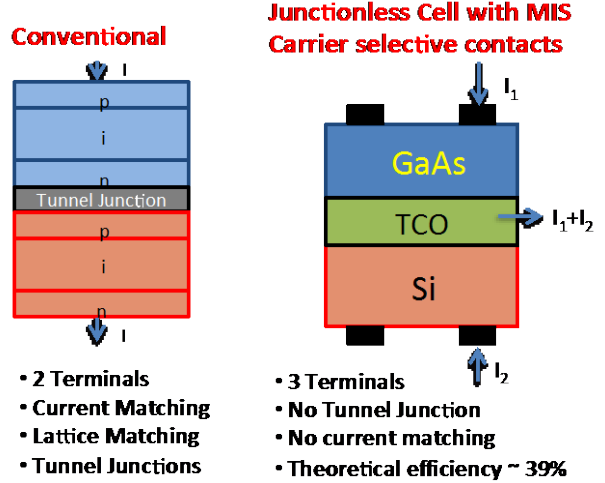
Significance and Impact:

Grow III-V on Ge grown on Si to fabricate the cell, and then transfer it to a Si cell using a TCO layer as a bond. Reuse Si to fabricate the next III-V cell, eliminating Ge feedstock, ingot, and wafer supply chain. Active cell area is made through the use of plentiful, inexpensive Si, Ge, and III-V source gases, as opposed to costly bulk Ge wafers. MIS contacts eliminate p-n junction formation, thus reducing thermal budget and further reducing cost.



Research Details:

- Heteroepitaxial growth of crystalline Ge on Si for use as a template for GaAs growth demonstrated.
- Elimination of p-n junctions by using carrier selective MIS contacts (TiO₂ and NiO) demonstrated.



Contact: Krishna Saraswat (saraswat@cis.stanford.edu)

PV-03, Task 3