Removing all obstacles to massive market penetration

Silicon heterojunction solar cells have less manufacturing steps and have allowed achieving higher efficiency than PERC cells. However the market has been slow in taking up the technology. Here we show some of the obstacles that have been overcome in the last 10 years which make the technology more ready than ever for a mass market launch.

Some new key recent results

- Certified SHJ on p-type!
- Results achieved with Demo-lines at Meyer Burger
- Production run, 6 inches, 23.65% busbarless
- 335 Watt 60 cells
- 410 Watt 72 cells
- Up to 92% bifaciality

Complex manufacturing processes. Solar cell makers do not use //... plate PECVD and PVD tools

- From thin film solar, flat panel displays and glass coating, low cost per m² from PECVD (e.g. parallel plate reactor) and PVD.
- Fewest number of process steps: 5-7 depending on tools and processes
- Alternative deposition techniques available (hot wire, TCO by PAME)
- Easily controlled homogeneity with good tool design
- > 20 research institutes and (pilot) lines with above 22% efficiency

Fully controlled. Good tools will make in one day => 20% cells

Cost of electricity

- Low temperature coefficient (-0.2%/°C to -0.2%/°C)
- No PID
- High bifaciality
- Highest energy yield and lowest LCOE
- A. Richter et al. IEEE WCPEC-7

Upside potential

- Transform to IBC with 5-8% rel. Eff. increase
- Move to multijunction III-V/Si (35.9%**)
- Perovskite tandem devices
- 25.2% certified record for P2K/Si textured

Conclusions

Over the last 10 years, improvements in:
- Processes compatible with industrial production,
- Efficiency achieved on production tool,
- Metallization and interconnections, reliability, material quality,
- Tools for cost-effective production.

If/when capital is available, Si heterojunction technology is ready for true mass market launch

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