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Simulations of Thermomechanical Stress in Silicon Photovoltaic Modules

The use of simulations to predict how wafer firing, cell interconnection and module lamination processes affect the induced stress in silicon wafers that can cause cracks, which limit production yield and module durability.

Competitive advantage

- Expertise in finite element modelling of thermomechanical stress in mixed material systems
- Pending patents for methods of reducing the induced thermomechanical stress in silicon wafers through use of interconnection geometry
- Ability to identify regions of high stress induced by different interconnection methods for wafers of varying thickness

Impact

- Can be combined with optical simulations of electricity yield to identify module configuration that maximises optical and electrical performance whilst ensuring improved durability.

Successful outcomes

- Identified patterns of thermomechanical stress in silicon photovoltaic modules interconnected with soldered ribbons and wires
- Identified impact of interconnection geometry on stress evolution

Capabilities and facilities

- Silicon photovoltaic module fabrication and testing facilities

Our partners

- LONGi Solar
- Sizhuo PVTech Hebei
- 3M
- DSM
- ECN (part of TNO)

More Information

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