Carrier Selective Contacts for Silicon Solar Cells

Investigating a wide range of passivating contacts, which selectively extract the holes and electrons and reduce surface recombination in industrial silicon solar cells, to mitigate recombination losses at the contacts and improve efficiency.

Competitive advantage

- The only laboratory in Australia that has an atomic layer deposition reactor with real-time feedback on the synthesised material, offering unprecedented advantages in terms of process optimisation and device integration
- Cutting-edge device optimisation informed by a high-level understanding of device fundamentals
- Real-time insight and control of thin film growth and its correlation to final device performance
- Ability to perform atomic-scale engineering using atomic layer deposition
- Using an advanced, computational material science approach to identify the most promising materials before synthesising them

More Information

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Impact

- A process to lower the contact resistance of screen-printed contacts was successfully transferred to high-volume manufacturing in less than 2 years after first demonstration at the laboratory scale.

Successful applications

- Demonstrated that the contact resistance of screen-printed contacts could be lowered by the application of nanoscale aluminium oxide films
- Showed that the electronic properties of nanoscale nickel oxide could be changed by doping
- Developed a low-cost method for growing tunnelling oxides for poly-silicon contacts which can easily be integrated in PECVD and PVD equipment

Capabilities and facilities

- Both laboratory-scale and pilot-scale atomic layer deposition reactors to explore novel process from low- to high-technology readiness level
- Access to both lab-scale as well a pilot-scale thin film deposition equipment for swift transfer from the laboratory to the factory

Our partners

- Leadmicro, a leading equipment manufacturer from China
- A number of non-disclosed solar cell manufacturers