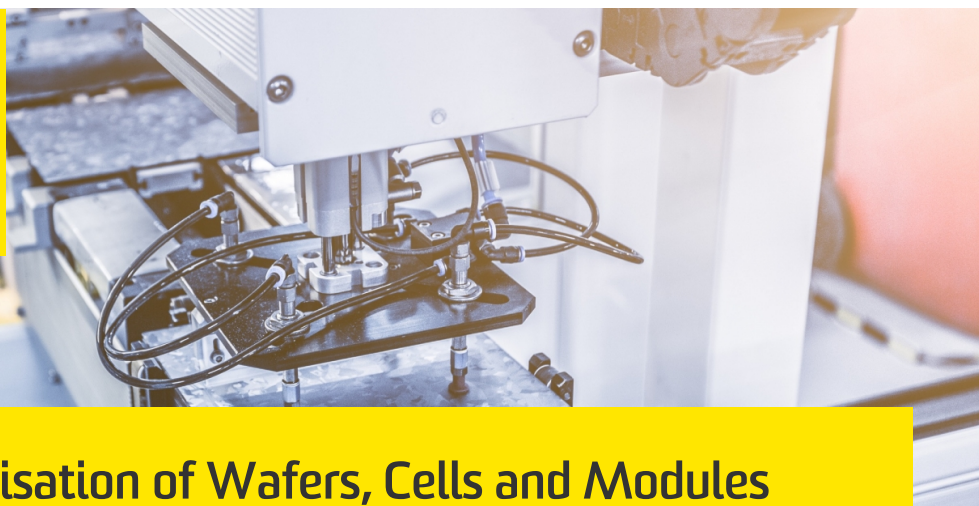




UNSW
SYDNEY



Advanced Characterisation of Wafers, Cells and Modules

Advanced inspection systems and characterisation methods have been developed that cover the entire photovoltaic chain of wafers, cell and modules. These unique techniques are then used to investigate defects and degradation mechanisms at any level of a photovoltaic system.

Competitive advantage

- World-best lifetime tester for silicon wafers developed
- Developed machine learning applications for photovoltaics that include identification of defects and degradation mechanisms based on lifetime measurements or luminescence images
- The first and only contactless outdoor luminescence imaging system for photovoltaic modules in the field

Impact

- Helping to meet the ICCP report target of 8-10 TW peak power of installed photovoltaic by 2030, through developing novel methods to quantify and identify the nature of defects in silicon wafers and developing methods for early detection of degradation mechanisms across the entire photovoltaic chain. These developments will lead to lower production costs, higher efficiency cells and more reliable systems.

Successful outcomes

- Determination of the parameters of the defect responsible for LeTID in mc-Si wafers
- Determination of defect parameters in n-type float-zone wafers
- Development of photoluminescence imaging systems with spatially inhomogeneous illumination and at uniform excess carrier concentration
- Imaging of installed modules in solar field and on solar cars
- Machine learning applications for photovoltaics

Capabilities and facilities

- Lifetime measurements at a wide temperature range (80 – 680 K)
- Lifetime measurements of metallised samples
- Current-voltage measurements at a wide temperature range (80 – 680 K)
- Optical and spectral measurements at a wide temperature range (80 – 680 K)
- Photoluminescence measurements at uniform excess carrier concentration
- Contactless outdoor photoluminescence imaging

Our partners

- Sinton Instruments

More Information

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