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SYDNEY

Thin Film Technology for Flexible Solar Photovoltaics and High-Efficiency Tandem Solar Cells

Work on a range of thin film solar cell technologies to offer a renewable solution to generate electricity. These not only enable flexible photovoltaic products, but also lower the cost of silicon PV by increasing solar photovoltaic energy conversion efficiency through the use of high-efficiency tandem cells

Competitive advantage

- Hold world record of 11% for highest efficiency high bandgap pure sulphide Kesterite CZTS ($\text{Cu}_2\text{ZnSnS}_4$) solar cells and have established 4 world records for this photovoltaic technology
- Developed 21% efficient low-temperature ($<200^\circ\text{C}$) processed planar perovskite solar cells with improved stability without encapsulation
- Developed above 30% efficiency III-V/Si tandem solar cells
- Designing and developing new PV materials that are made from environmentally-friendly and earth-abundant materials for Silicon based tandem cells

Impact

- The aim is to make solar photovoltaic more efficient, cost-effective and competitive for the energy market and for their applications in various aspects of our life such as building- and vehicles-integrated PV, and portable power sources
- The breakthroughs in kesterite represent a major advance in developing solar cells that are flexible, stable, cheap and non-toxic

Successful outcomes

- Working with industry partners for building-integrated PV (2015-present)
- Working with industry partners for III-V/Si tandem solar cells (2011-present)

Capabilities and facilities

- Laboratory for fabrication of high efficiency thin film solar cells (e.g. kesterite, perovskite, $\text{Sb}_2\text{S}_3(\text{Se})_3$), and associated function thin films e.g. transparent electrodes (TCO, Ag NW)
- Upgrading laboratory facility for pilot production level of tandem cells
- Advanced characterization tools for thin film photovoltaic materials and devices

Our partners

- Trina Solar
- Longi Solar

More Information

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