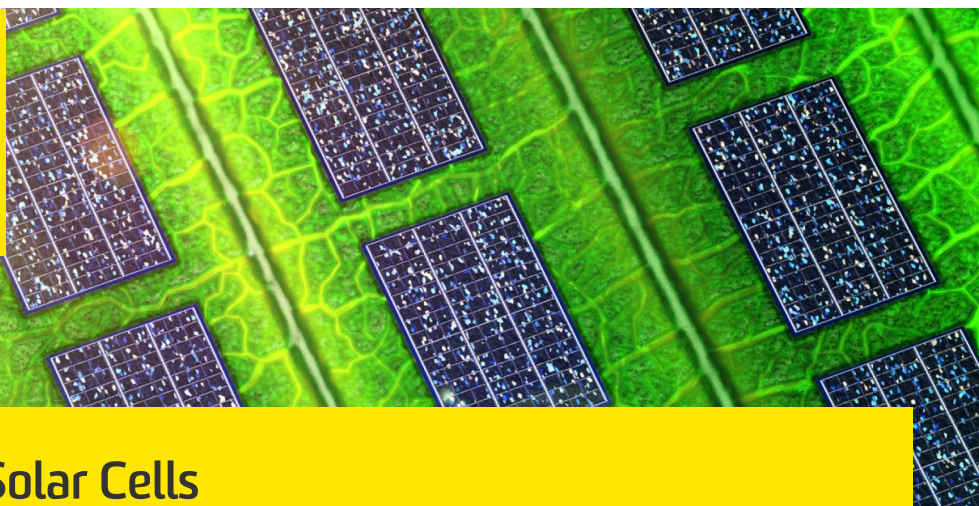




UNSW
SYDNEY



Advanced Concept Solar Cells

Seeking to demonstrate new, long-term approaches to photovoltaic power conversion that can fundamentally increase photovoltaic device efficiency.

Competitive advantage

- Deep conceptual understanding of the thermodynamic basis for solar power conversion
- World class semiconductor and molecular device fabrication and characterisation facilities

Impact

- Demonstrated the first hot carrier quantum well photovoltaic device
- Demonstrated a metallic hot carrier photovoltaic device where sunlight is extinguished in an 8nm layer of chromium

Successful applications

- Four patents on hot electron photovoltaic devices in collaboration with Toyota Motor Corporation
- One patent on hot electron photodetectors in collaboration with Sharp Corporation

Capabilities and facilities

- The SPECTRE Lab (SPECTroscopy for Renewable Energy) houses a suite of techniques that allow the measurement and development of advanced solar cell technologies using a tuneable femtosecond laser system
- Molecular approaches to spectral engineering to better utilize the solar spectrum. This includes the development of both optical and electrical devices
- Inorganic semiconductor based approaches to third generation photovoltaics including intermediate band solar cells and hot carrier solar cells
- Semiconductor Molecular Beam Epitaxy, capable of fabricating quantum heterostructure electronic devices with atomic layer control
- Atomic Layer Deposition of metal oxides

Our partners

- Toyota Motor Corporation
- Sharp Laboratories Europe

More Information

School of Photovoltaic and Renewable Energy Engineering

Hot Carrier Material Development

Professor Gavin Conibeer

T: +61 (0) 2 9385 5412

E: g.conibeer@unsw.edu.au

Associate Professor Santosh Shrestha

T: +61 (0) 2 9385 7267

E: s.shrestha@unsw.edu.au

Inorganic PV Device Architectures

Associate Professor Nicholas Ekins-Daukes

T: +61 (0) 2 9385 7283

E: nekins@unsw.edu.au

Semiconductor Epitaxy and Materials Characterisation Capability

Associate Professor Stephen Bremner

T: +61 (0) 2 9385 7890

E: stephen.bremner@unsw.edu.au

Molecular Materials and Devices Dr. Murad Tayebjee

T: +61 (0) 2 9385 7762

E: m.tayebjee@unsw.edu.au

Ultrafast Spectroscopy Scientia Fellow Dr Michael Nielsen

T: +61 (0) 2 9385 6053

E: michael.nielsen@unsw.edu.au

UNSW Knowledge Exchange
knowledge.exchange@unsw.edu.au
www.capabilities.unsw.edu.au
+61 (2) 9385 5008