

Atom clusters are advancing renewable energy efficiencies

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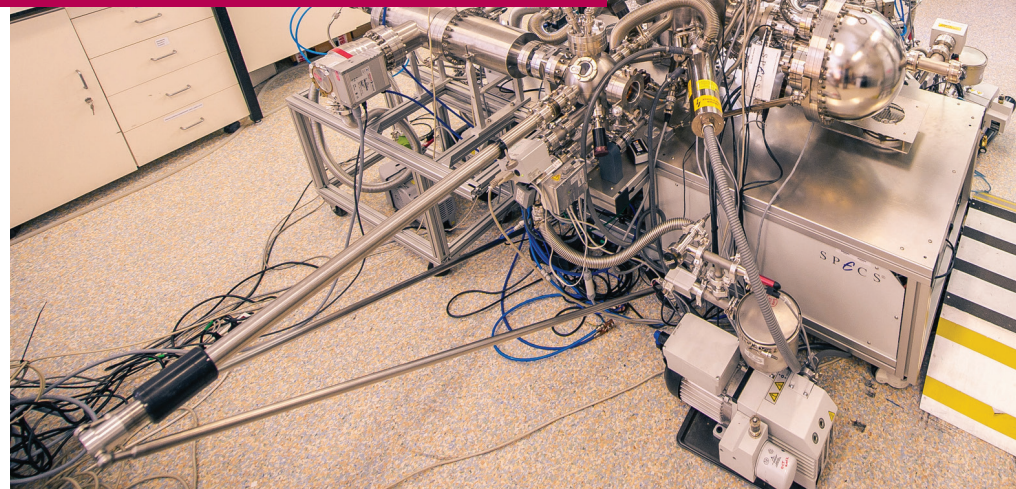
Leading surface scientist Professor Gunther Andersson and his team at Flinders University are developing novel experimental techniques to improve the efficiency of green energy technologies.

Seeking to understand and overcome the challenges of collecting, storing, and harnessing solar energy, Prof Andersson is arranging atoms into clusters to produce hydrogen fuel from water to achieve cost effective, renewable energy production.

Investigating atoms and clusters located on a surface that are below the nanometre scale is no easy task, so Prof Andersson combined six analysis techniques to develop one unique instrument that allows a detailed analysis of the sample's surface.

The instrument boasts a novel technique, Metastable Induced Electron Spectroscopy (MIES), which was constructed in collaboration with German-based SPECS Group and supported by the Australian National Fabrication Facility. MIES is unique, allowing investigation of the electronic structure of only the outermost layer of atoms - which is where all the interesting chemistry occurs.

Prof Andersson's new cluster-decorated surfaces act as a catalyst. Absorbed solar radiation activates water at the surface and allows water molecules to be split. This process creates oxygen and hydrogen gasses of which the hydrogen can



be collected, stored, and later used as a fuel.

Prof Andersson says to enhance hydrogen production you need to be able to tune the cluster of atoms on the surface.

"The clusters are the 'magic' in terms of splitting the water," he said.

"The multiple techniques available, including MIES, allows for the rapid fine tuning and monitoring of the cluster properties."

“Honestly, it's hard to imagine how we could meet our goals in our research without ANFF-SA.

**Prof Gunther Andersson,
Flinders University**”



The only instrument of its type in Australia, the MIES can be accessed through the South Australian node of the Australian National Fabrication Facility (ANFF-SA) along with other cutting-edge micro and nano fabrication equipment.

Through ANFF-SA, Prof Andersson and his research group can access all the equipment, techniques and expertise that are important for his research.

"Honestly, it is hard to imagine how we could meet our goals in our research without ANFF-SA," said Prof Andersson.

ANFF are expanding the capability of the MIES and building an Atomic Layer Deposition (ALD) system which will allow production and characterisation of samples within the one instrument.

The combined MIES and ALD system will enable researchers to monitor each stage of the cluster-tuning process to produce novel functionalised

surfaces for building exciting new catalysts.

For more information or support please contact Simon Doe on 08 302 5226 or visit www.anff-sa.com today.

South Australian Node of the Australian National Fabrication Facility

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