Northumbria University NEWCASTLE

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Shining a light on solar research

Northumbria researchers are working on a £2m project to investigate sustainable sunlight-harnessing materials.

Dr Ian Forbes, a Reader in Photovoltaics, is working with researchers at the University of Bristol to explore thin film photovoltaic (PV) technology based on Copper-Zinc-Tin Sulphide (CZTS) a material with a kesterite –crystal structure.

The technology uses raw materials that are less expensive and more widely available than those currently used in solar panels.

The PhotoVoltaic Technology based on the Earth Abundant Materials (PVTEAM) project received a £2m grant from the Engineering and Physical Sciences Research Council (ESPRC). The funding is part of a £10.3m investment in research to find safer and more sustainable alternatives to the rare, expensive and difficult to source raw materials that manufacturing industries rely upon.

PVTEAM's aim is to replace expensive key elements currently used in solar cells with materials that would be compatible with large-scale manufacturing. The project is the first UK initiative to develop inorganic photovoltaic technologies that can be mass-produced using both sustainable materials and processes.

The PVTEAM, led by the University of Bristol, is one of only four successful winning research projects in the country. It includes Northumbria University and the universities of Bath, Loughborough and Swansea.

Researchers at Northumbria are working with incredibly thin technology, 30 times thinner than a single strand of hair, and made using only a few milligrams of copper, zinc and tin, to ensure the panels are cheap and capable of being mass produced. The team will make devices from kesterites and other materials using vacuum and non-vacuum processes.

Dr Forbes said: "EPSRC's funding provides an exciting opportunity to develop new and sustainable materials using low-cost, non-vacuum, processing, in preparation for large scale deployment of PV as a functional building product.

"More solar energy falls on the Earth's surface in one hour than the entire global population uses in a year. It is important that we increase our capabilities of using the sun as an energy source. Research is needed to find the best performing thin film technology that is based on sustainable materials and is capable of being cheaply manufactured, bringing down the price of photovoltaic energy."

The other projects receiving funds from the EPSRC will investigate cheaper and more sustainable alternatives for transparent conducting oxide materials used in phones and computers; thermoelectric materials used in sensors and energy harvesters; and will explore how food waste or wood shavings could be turned into home insulation or engineering materials for house construction.

By the end of the study the research will enable manufacturers to adopt alternatives.

David Delpy, Chief Executive of the Engineering and Physical Sciences Research Council, said: “Through the development and deployment of improved materials, processes and products that will come from this research, UK industries will be able to create wealth and new jobs, whilst at the same time tackling the societal and environmental challenges that resulted from the use of the original materials which were often rare and difficult to refine.”

Minister for Universities and Science, David Willetts, added: “As one of the eight great technologies of the future, Advanced Materials will ensure safer and more sustainable development of resources to boost the capability of UK manufacturing. This investment in research will help keep the UK ahead in the global race for exciting manufacturing innovations.”

Northumbria University is also a member of a £3.7m KESTCELLS consortium, made up of key European universities, research institutions and companies, tasked with developing PV technologies.

The aim is to make PV technologies a reliable alternative to non-renewable energy sources. To support this, consortium members are creating a training network of researchers to become experts in the development, design and assessment of thin film PV technologies based on these materials.

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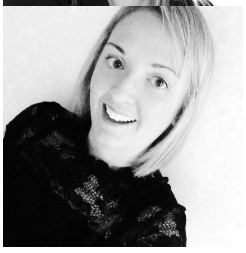

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