Double solar world record

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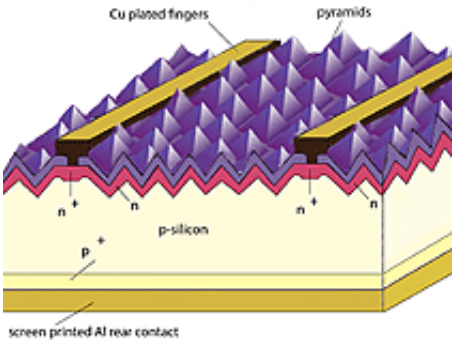

diagram of an LDSE cell

(PhysOrg.com) -- A world record double by UNSW solar cell researchers promises to make solar power more affordable, with world-beating new technology delivering substantial efficiency gains at minimal extra cost.

Using a patented laser process, researchers from UNSW's Photovoltaics Technology Transfer Team, working with solar technology firm Centrotherm, achieved a new world benchmark of 19.3 percent efficiency in May for a mass-produced, crystalline silicon solar cell. They improved that result in June to advance the record to 19.4 per cent.

The previous record for cells created with this process was 18.9 per cent.

The new cells compare favourably with the 18 per cent-efficient cells commonly used in rooftop solar panels.

Dr Matt Edwards, Program Manager of the Photovoltaics Technology Transfer Team in the UNSW School of Photovoltaic and Renewable Energy Engineering, said the records were achieved without exotic materials or equipment.

"The exciting aspect of these records is that we achieved these results in a short time, using an industry-standard silicon wafer and modified industry-standard equipment," he said.

"It's another step closer to solar power costing the same as coal-fired electricity."

Dr Edwards said the gains, achieved on a standard p-type CZ silicon wafer, had produced a low-cost cell which delivered "the best bang for your buck" of any mass-produced cell in the world.

The record-breaking cells were produced using UNSW's patented Laser Doped Selective Emitter (LDSE) process, which uses a high-powered laser and a light-induced plating process to create ultra-fine metal contacts on the cell surface, leaving more area exposed to light to create more power.

One of the advantages of LDSE technology is its ability to boost cell efficiency with simple modifications to existing screen-printed solar cell production lines – the most common mass-production systems in use today. The process is already in pilot production at some facilities.

Dr Edwards said the group was now working on a new technology, double-sided LDSE (D-LDSE), which optimises both the front and rear surfaces of a solar cell to deliver efficiencies of up to 22 per cent.

The new 19.4 per cent efficiency record was verified by the Fraunhofer ISE Solar Cell Calibration Laboratory and a paper detailing the work will

be published in the inaugural edition of the Journal of Photovoltaics.

Provided by University of New South Wales