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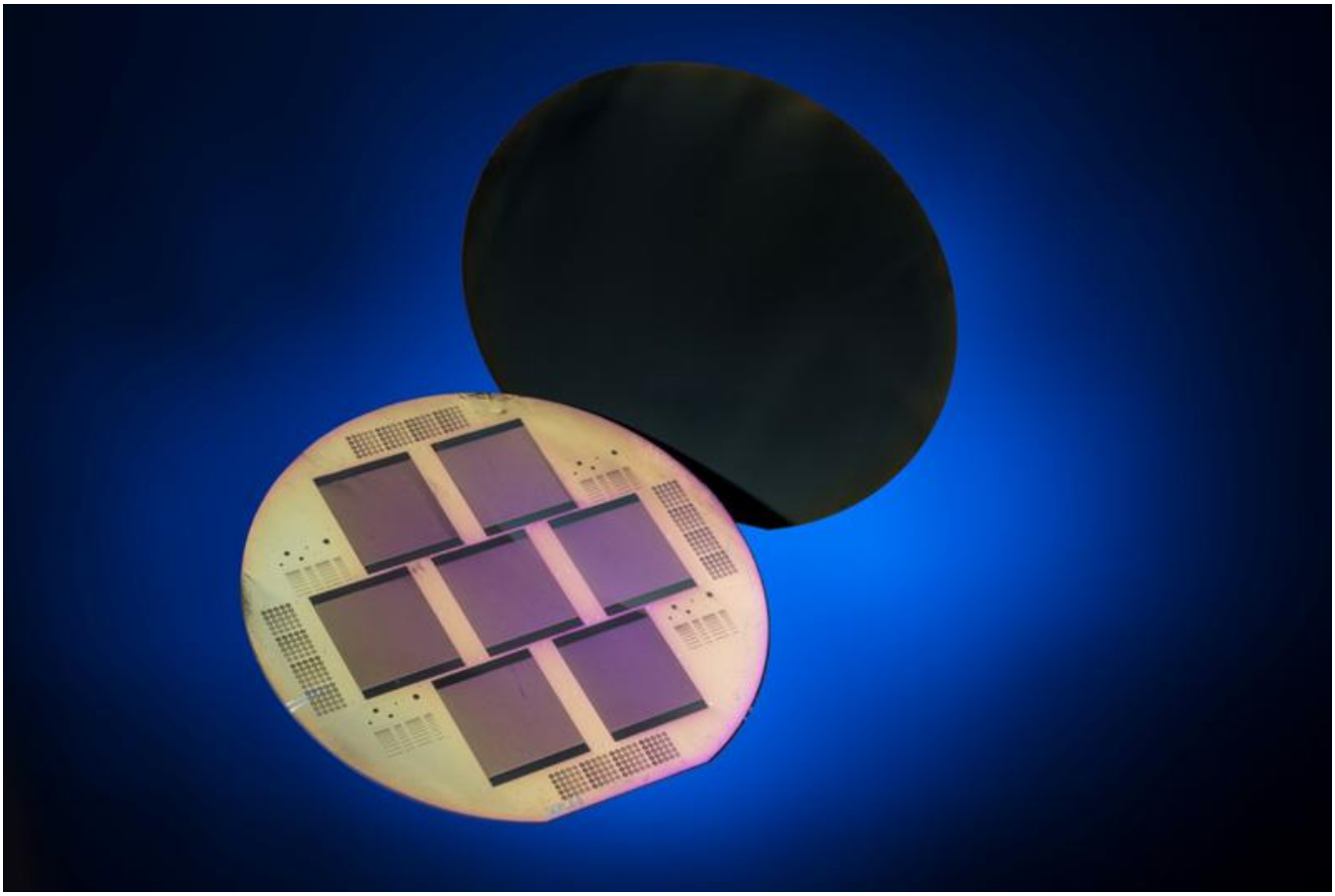
Silicon solar cell of ISFH yields 25% efficiency with passivating POLO contacts

The Lower Saxon‘ Institute for Solar Energy Research Hamelin (ISFH) achieved a solar cell efficiency of 25 % in collaboration with the Institute of Electronic Materials and Devices (MBE) of the Leibniz Universität Hannover. This high efficiency was accomplished with passivating "poly-Si on oxide" contacts (POLO) for both polarities, which avoid the otherwise high recombination beneath the metal contacts.

The Lower Saxon‘ Institute for Solar Energy Research Hamelin (ISFH), an affiliated institute of the “Leibniz Universität Hannover” in collaboration with the Institute of Electronic Materials and Devices (MBE) of the “Leibniz Universität Hannover” achieved a solar cell efficiency of 25 %. This result was confirmed by DAkkS-accredited independent calibration laboratory ISFH CalTeC and presented at the Asian conference PVSEC-26 in Singapore.
This high efficiency was achieved with passivating POLO contacts for both polarities, which avoids the otherwise high recombination beneath the metal contacts. POLO stands for “poly-Si on oxide”. The contacts consist of a thin silicon oxide and a doped polycrystalline silicon layer. The recombination is reduced by the POLO contacts to an extend enabling a high open circuit voltage of 723mV. Both polarities of the POLO layers are located at the rear side of the solar cell, avoiding the shading of the front side by metal fingers and reducing the parasitic absorption in the poly-Si. The result was achieved on a cell area of 3.97cm2 (designated area).

In the ongoing project the efficiency shall be further increased and complex process steps shall be substituted by industrial relevant processes. The work was achieved within a joint project, funded by the German Federal Ministry for Economic Affairs and Energy (BMWi), where ISFH cooperates with MBE and the Fraunhofer-Institut für Solare Energiesysteme (ISE).



Monocrystalline 25%-silicon solar cell with POLO-contacts for both polarities on the rear side of the solar cell.
ISFH