# Large area industrial crystalline silicon n-PERT solar cell with a record 22.5 percent efficiency

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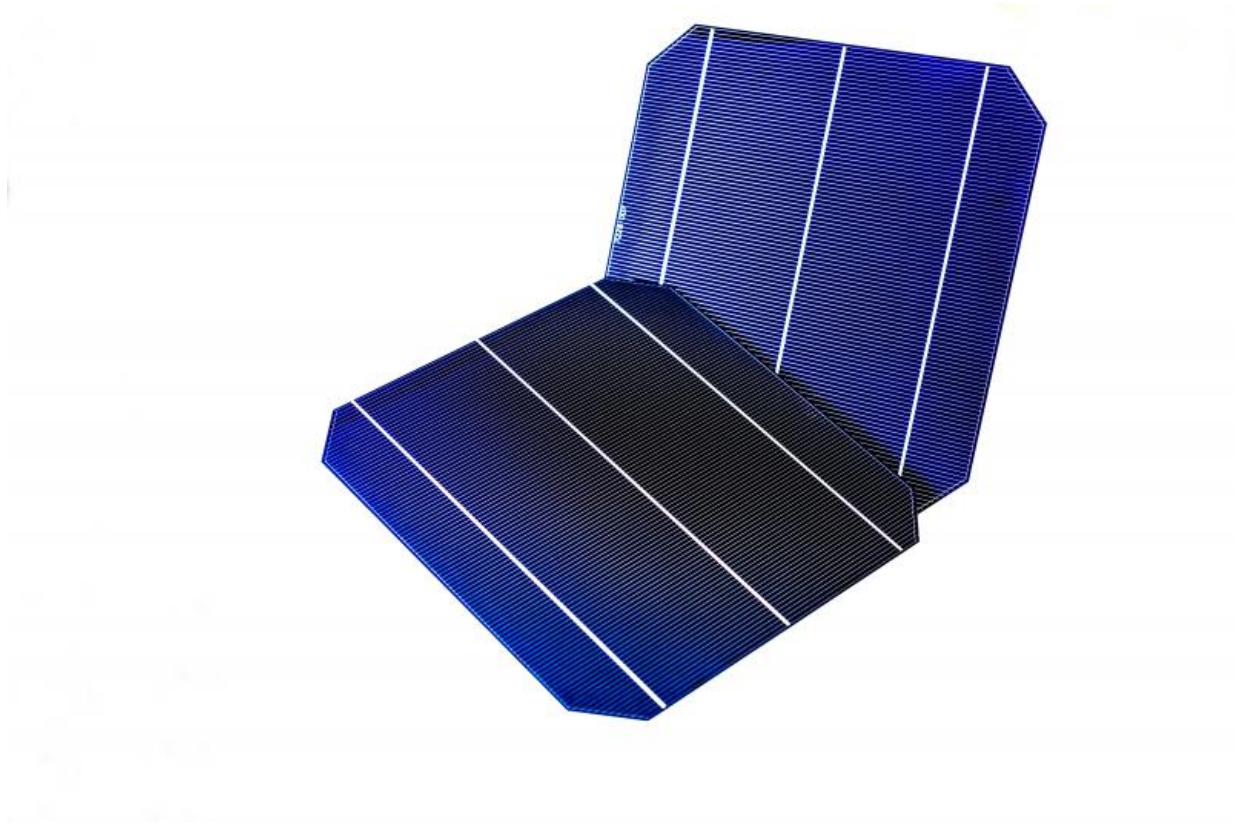

Large area industrial crystalline silicon n-pert solar cell with a record 22.5 percent efficiency.

Nano-electronics research center imec announced today at Intersolar

Europe, a new efficiency record for its large area n-type PERT (passivated emitter, rear totally diffused) crystalline silicon (Cz-Si) solar cell, now reaching 22.5 percent (calibrated at ISE CalLab). It is the highest efficiency achieved for a two-side-contacted solar cell processed on six inch commercially available n-type Cz-Si wafers without the use of passivated contacts.

N-type silicon solar cells are considered as promising alternatives to p-type solar cells for next generation highly efficient solar cells thanks to their ability to withstand light-induced degradation and to their higher tolerance to common metal impurities.

Aiming to increase the conversion efficiency of n-type silicon solar cells, imec is exploring material and architectural improvements to extend its n-PERT solar cell concept. The cells feature Ni/Cu/Ag front contacts, rear local contacts, a diffused front surface field (FSF) and a rear emitter. The cells achieved an independently confirmed open-circuit voltage (Voc) of 689mV, a short-circuit current (Jsc) of 40.3 mA/cm2, and 80.9 percent fill factor (FF).

Imec has also been exploring n-type PERT cells with a rear side p-type emitter using epitaxial growth or heterojunction processes. These advanced architectures have reached promising conversion efficiencies approaching 22 percent. We are confident that these advanced concepts will help us to further push the conversion efficiency and decrease the cost of n-PERT solar cells.

Filip Duerinckx, manager of imec's n-PERT technology platform stated: "This new record is a testimony of our technology leadership in developing next-generation silicon photovoltaics solutions. We have a strong commitment to continue increasing the efficiency our n-PERT technology, and are very optimistic that these achievements will further pave the way to industrialization in the near term."

The presented results have been achieved in the framework of imec's industrial affiliation program on advanced silicon solar cells, dedicated to developing high performance and low cost Si PV-technologies. In this program, imec works closely together with industrial and academic partners along the solar cell value chain. Through participation and contribution to this program, these partners support imec's developments and obtain early access to new technology solutions thereby accelerating their own product development.

Provided by IMEC