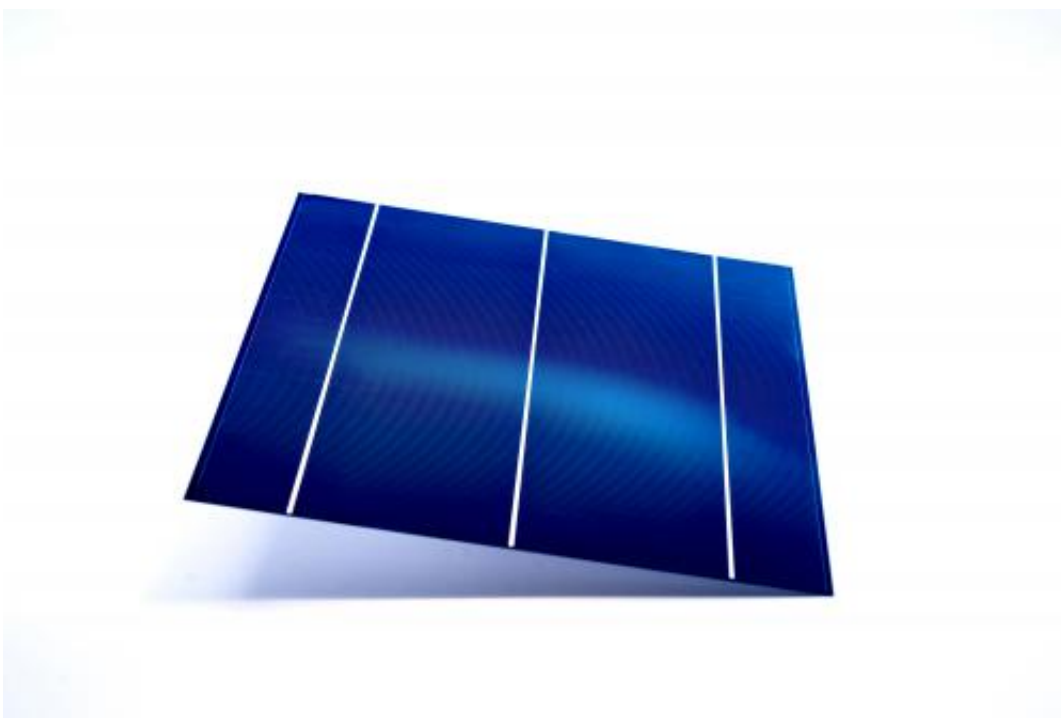


Imec simplifies i-PERC solar cell processing by implementing laser doping from ALD-Al₂O₃

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Nanoelectronics research centre IMEC announced today that they have developed large area (156x156mm²) i-PERC-type silicon solar cells using a new processing sequence based on laser doping from a thin atomic layer deposited (ALD) aluminum oxide (Al₂O₃) layer to realize the local aluminum Back Surface Field (BSF) and Ni/Cu plating to form

the front contact. The cells achieved average conversion efficiencies of 20.2%.

The new laser doping processing sequence eliminates the necessity of a firing step to create the local BSF in i-PERC solar cells. Combined with imec's Ni/Cu plating sequence for front contact formation, it provides a low temperature metallization solution for i-PERC cells. By avoiding high temperature conditions, passivation degradation of the rear Al₂O₃ layer, as well as optical degradation of the rear dielectric/metal stack are prevented, resulting in improved solar cell conversion efficiency. Additionally to the performance benefit, this new process sequence is extremely simple because the thin ALD Al₂O₃ acts at the same time as passivation layer and doping source, while [laser](#) processing enables in one step the contact patterning and the local BSF formation.

The complete solar cell process was executed at imec and the resulting 156x156mm² i-PERC silicon cells on p-type Cz-Si achieved an average conversion efficiency of 20.2%. Even though only low temperature anneal was used, the high Fill Factor of the cells (up to 80%) indicates an excellent contact quality.

"Cost-of-ownership and process simplicity are key factor for the industry to adopt new technologies," stated Jozef Szlufcik, Si PV program director at imec. "Our achievement, implying a substantial simplification of the i-PERC manufacturing process, is an important step towards reducing the cost-of-ownership of i-PERC technology and as such, a milestone in bringing this high-efficiency technology for silicon solar cells to the market."

These results have been achieved in the framework of the imec's industrial affiliation program on advanced [silicon solar cells](#), dedicated to developing high performance and low cost Si PV-technologies.

Provided by IMEC

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