

Interdigitated back-contact silicon solar cells above 23% efficiency

December 2 2011



Caption: Interdigitated back-contact silicon solar cells above 23% efficiency

Imec together with its silicon photovoltaic industrial affiliation program partners Schott Solar, Total, Photovoltech, GDF-SUEZ, Solland Solar, Kaneka and Dow Corning, have demonstrated an excellent conversion efficiency of 23.3% on interdigitated back-contact (IBC) silicon solar cells.

Interdigitated back contacts are introduced to increase the [conversion efficiency](#) of crystalline [silicon solar cells](#) and allow for further reduction of the cell thickness, simplification of module fabrication and improved aesthetics of the final solar cell modules. Imec has developed a high-efficiency baseline process for small-area IBC cells within its multi-partner silicon solar cells industrial affiliation program that aims at increasing the efficiency well above 20% and decreasing the cost of

silicon solar cells beyond the current state-of-the-art.

Key aspects of the newly developed small-area (2x2 cm²) IBC Si solar cells are the n-type base float-zone (FZ) silicon substrates, a random pyramid texture, a boron diffused emitter, phosphorous diffused front- and back surface fields, a thermally grown [silicon dioxide](#) for surface passivation, a SiN single layer anti-reflective coating, lithography based patterning and Aluminum metallization. The realized IBC cells achieve a designated area conversion efficiency of 23.3% ($J_{sc} = 41.6$ mA, $V_{oc} = 696$ mV, $FF = 80.4\%$), certified by ISE-Callabs.

Jef Poortmans, director of imec's photovoltaic R&D program: "We are delighted to demonstrate these excellent efficiency results on IBC silicon solar cells. They prove the relevance of the IBC technology to our industrial partners. Such high efficiencies on small-area IBC silicon solar cells are a perfect base for further developing a large-area and industrially feasible IBC cell technology at imec."

"As silicon photovoltaic industrial affiliation program partners of imec we are very happy with this new result", says Dr. Martin Heming, CEO of SCHOTT Solar. This German solar manufacturer was the first industry partner to join imec's program on silicon [solar cells](#). "The test result confirms our confidence in imec's excellent PV R&D capabilities and vision, and it allows us to acquire important know-how and IP as basis for our next generation solar cell products."

Provided by IMEC

Citation: Interdigitated back-contact silicon solar cells above 23% efficiency (2011, December 2) retrieved 27 April 2024 from <https://phys.org/news/2011-12-interdigitated-back-contact-silicon-solar-cells.html>

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