

Imec, RENA and SoLayTec present innovative ALD passivation for high-efficiency i-PERC Silicon Solar Cells

EUPVSEC 2012 (Frankfurt, Germany) – September 24, 2012 - At this week's European Photovoltaic Solar Energy Conference and Exhibition (27th EUPVSEC, 24/08-28/08), imec, RENA and SoLayTec present thin (165µm), large area (156x156mm²) i-PERC-type Silicon solar cells with ALD (atomic layer deposition) passivation achieving a cell efficiency of 19.6% without selective emitter using an industrial screen printing process flow.

The solar cell manufacturing has been performed within imec's solar cell pilot line using RENA in-line lab equipment for the rear-side polishing and emitter removal steps, and the SoLayTec in-line spatial ALD process development tool (InPassion LAB) for the ALD-Al₂O₃ deposition. Within imec's i-PERC process flow, a conversion efficiency of 19.6% (*) with an open circuit voltage Voc of 665mV has been delivered for the best cell, with an average of 19.4% for the small series batch. "These results indicate that spatial ALD-Al₂O₃ can offer excellent passivation without suffering from front-side parasitic deposition;" explains Dr. Aude Rothschild, Senior scientist and responsible for the Al₂O₃ passivation development in imec's PV department. "The excellent passivation level obtained with the technology allow for even higher efficiencies so that further improvement of solar cell performance is expected in the near future. We are aiming at +20% efficiency in the coming months."

Franck Delahaye, product manager solar at RENA: "This excellent cell result shows the maturity of RENA's InPolish for rear-side polishing and InOxSide for junction isolation for next generation cell concepts as i-PERC".

Roger Görtzen, Co-founder and manager marketing and sales at SoLayTec: "The excellent rear-side passivation results show the properties of SoLayTec's ALD Al₂O₃ process. The lab process is scalable to volume production. Together with the low TMAI consumption, it results in the lowest cost of ownership. This is the first choice passivation layer for high efficiency and thin p-type PERC silicon solar cells."

The results were achieved within imec's silicon solar cell industrial affiliation program (IIAP), a multi-partner R&D program that explores and develops advanced process technologies aiming a sharp reduction in silicon use, whilst increasing cell efficiency and hence further lowering substantially the cost per Watt peak.

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About imec

Imec performs world-leading research in nanoelectronics and photovoltaics. Imec leverages its scientific knowledge with the innovative power of its global partnerships in ICT, healthcare and energy. Imec delivers industry-relevant technology solutions. In a unique high-tech environment, its international top talent is committed to providing the building blocks for a better life in a sustainable society. Imec is headquartered in Leuven, Belgium, and has offices in Belgium, the Netherlands, Taiwan, US, China, India and Japan. Its staff of close to 2,000 people includes more than 600 industrial residents and guest researchers. In 2011, imec's revenue (P&L) was about 300 million euro. Further information on imec can be found at www.imec.be.

Imec is a registered trademark for the activities of IMEC International (a legal entity set up under Belgian law as a "stichting van openbaar nut"), imec Belgium (IMEC vzw supported by the Flemish Government), imec the Netherlands (Stichting IMEC Nederland, part of Holst Centre which is supported by the Dutch Government), imec Taiwan (IMEC Taiwan Co.) and imec China (IMEC Microelectronics (Shanghai) Co. Ltd.) and imec India (Imec India Private Limited).

About RENA

RENA GmbH is a leading supplier of production systems for the wet chemical processing of substrates for the photovoltaics and semiconductor industries and for circuit board and medical technology. Around 50 % of the solar cells worldwide are processed using RENA systems. In 2011 RENA recorded a total output of approximately EUR 400m. The 2012 integration of the SH+E GROUP brought best expertise in water supply as well as water and chemistry recycling for industry and communal applications to RENA. In the business year 2010/2011 the SH+E GROUP generated a total turnover of over EUR 250m.

For more information, please visit www.rena.com

About SoLayTec

SoLayTec is a spin-off company from the Dutch research organisation Toegepast Natuurwetenschappelijk Onderzoek (TNO) and established in 2010. The company develops, delivers and services machines for atomic layer deposition (ALD) on solar cells worldwide. The SoLayTec ALD machines are intended for research and industrial production in the solar market. SoLayTec high volume production equipment will be exclusively sold by RENA GmbH on the market.

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