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Press Release

Schmid processes and systems help achieve new efficiency record of over 20% for mono-crystalline solar cells with screen-printed metallization

Freudenstadt, 24 August 2011 – Schott Solar AG has set a new efficiency record for mono-crystalline silicon solar cells in the industrial 156 x 156 millimeter format. Fraunhofer ISE Institute of Freiburg has independently confirmed a peak efficiency of 20.2%. For production of the front side of the cell, Schott Solar AG Company based in Mainz made use of established production engineering technologies of Schmid Group from Freudenstadt.

The key to exceeding the efficiency mark of 20% for the first time lay in combining an optimized front and rear cell surface in an innovative cell design.

The front surface of the record-breaking cell was completely designed and processed in Schmid's Technology Center in Freudenstadt. Processes applied included the use of alkaline texturing in the horizontal in-line process, the entire chain of immediate downstream production steps including formation of the p-n junction, and the most effective and well established selective emitter technology used in tier 1 manufacturing sites worldwide. Final processing was carried out by Schott Solar in Alzenau. For this purpose, the PERC structure concept, previously developed and successfully implemented by Schott for multi-crystalline cells, was applied.

"We are very pleased to have been able to make a crucial contribution toward achieving a new efficiency world record. This proves once again that our technologies are excellently suited to manufacture high-efficiency cells, as many of our customers do today, and also perfect for future, even more efficient cell architectures", emphasized Dr. Christian Buchner, Vice President of Business Unit Cell with the Schmid Group.

Combining in-line process for alkaline wafer texturing with the well-established production process for creating a selective emitter structure resulted in virtually perfect performance of the cell front surface. Both technologies were developed, implemented and optimized in the R&D Center of high-tech specialist Schmid, and are characterized by their wide process window and resulting production stability. These qualities were pivotal for their rapid and successful application in industrial production of high-efficiency solar cells.

"We expect that further technological improvement of the front-side metallization will, in the near future, achieve a cell efficiency of 20.5%, while at the same time substantially reducing the amount of silver required for the emitter electrode. Facing continued cost pressure, this will increase the competitiveness of photovoltaics in comparison to conventional sources of energy even further", says Dr. Buchner.

The new efficiency record of 20.2% is 0.6% higher than the previous value and more than 2% higher than that of conventional solar cells which, in mass production, achieve an efficiency of some 18%.

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