

Corporate News

centrotherm photovoltaics reports selective emitter technology success: 17.1 percent average efficiency on multi-crystalline material

- **Mono: New back side achieves best values of 18.6 percent**
- **Values significantly exceed the current industrial average**

Blaubeuren, December 17, 2009 – centrotherm photovoltaics AG is reporting an additional milestone achievement of its solar cell division. Once again documenting the strong performance of its in-house research and development, average efficiencies of 17.1 percent have now been achieved on high-quality, multi-crystalline customer material. The reference surface area of the related wafers is 156 times 156 mm². Consequently, all values significantly exceed the current industrial average of around 15.7 percent. With these results, the photovoltaic specialists from Blaubeuren demonstrate the great potential inherent in the selective emitter technology in the multi-crystalline area. centrotherm photovoltaics already guarantees production efficiencies of 16.6 percent for the mass production of multi-crystalline cells using the "FlexLine Plus" turnkey production line presented in March 2009. The efficiency enhancements achieved are the result of the newly developed cell front side based on selective emitter technology. First production lines with selective emitter technology have been sold to Asia.

Selective emitter technology

The emitter coating is the uppermost coating of a solar cell exposed to light. Conventional emitters exhibit a high phosphorus concentration. As a consequence, most of the light that the emitter absorbs is converted into heat, and cannot contribute to electricity generation within the solar cell. The selective emitter technology significantly diminishes this absorption loss applying a high phosphorus concentration only to a partial area where it is essential. This enlarges the effective cell area that can absorb light, and convert it into electricity.

Research and development results available as upgrade for existing customers

centrotherm photovoltaics is directly passing on the achieved development progress to customers in the form of upgrade options for existing turnkey production lines: the company is thereby optimizing standard processes that have been available on the market to date, which employ homogeneous emitters. At the same time, innovative production

processes such as the selective emitter technology are being developed in such a way that they can be integrated and retrofitted into existing process flows.

centrotherm photovoltaics is pursuing a research and development roadmap that envisages an annual efficiency enhancement of 0.5 percent in the mono- and 0.4 percent in the multi-crystalline cell areas. "An efficiency enhancement of 0.5 percent allows production costs to be cut by around 3 percent," was how Dr. Peter Fath, CTO of centrotherm photovoltaics, summed up the significance of this goal. "This allows us to continuously realize cost-saving potentials for our customers that strengthen their competitiveness."

New back side achieves best values of 18.6 percent without selective emitter (mono)

Following the optimization of the cell front side based on selective emitter technology, the company's continued roadmap aims to restructure the cell back side as part of the next step. Already in the initial process runs for the new cell back side, the centrotherm photovoltaics research and development team has achieved best values of 18.6 percent on a mono-crystalline material. The company anticipates that significantly higher results can be attained in combination with the selective emitter technology on the cell front side. "Using selective emitters and further retrofitting packages, we are achieving efficiency enhancements for crystalline solar cells that hold potential for the mass production of high-efficiency cells," Dr. Fath went on to comment. "We are already significantly ahead of our roadmap objectives for 2009."

About centrotherm photovoltaics AG

centrotherm photovoltaics AG, which is based at Blaubeuren, is one of the world's leading technology and equipment providers for the manufacturing of solar silicon, crystalline solar cells and CIGS thin film modules. The broad product spectrum comprises key equipment and turnkey production lines for crystalline and thin-film solar cells. The product range is supplemented by reactors and converters for the manufacturing of solar silicon. centrotherm photovoltaics guarantees its customers important performance parameters such as production capacity, degree of efficacy, and completion deadlines for turnkey lines. The Group employs around 1,100 staff members, and operates in Europe, Asia and the USA. centrotherm photovoltaics achieved revenue in the 2008 financial year of €375 million, EBIT of €56 million*, and is listed in the TecDax of the Frankfurt Securities Exchange. (*before purchase price allocations)

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