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Dainippon Screen and Gifu University Invent New Analytic Technology for Next-Generation Thin Film Solar Cells

***Targeting World-First Product Commercialization: Incorporated into Film Thickness
Measurement System Capable of Non-Contact, Non-Destructive Analysis of Large Panels***

Kyoto, Japan -- June 21, 2010 -- Dainippon Screen Mfg. Co., Ltd. and Gifu University have invented a new technology for analyzing the characteristics of amorphous silicon films for thin film silicon solar cell panels. This technology is expected to be important for the development of next-generation low-cost solar cells. The results of this research are being utilized in spectroscopic ellipsometric film thickness measurement systems produced by Screen, with product creation scheduled for completion this autumn.

With thin film silicon solar cells, large-size cell panels can be manufactured using a small amount of silicon. This makes the panels ideal for mass production and also gives them excellent cost performance. They are expected to be valuable for applications such as ground-installed solar cells, including mega solar systems.* In contrast, the excess hydrogen introduced during the process to form amorphous silicon films on glass substrates is responsible for light-induced degradation,** which is also a significant problem for thin film multijunction solar cells targeting high optimization. However, previously, there was no sufficiently developed technology to accurately analyze the hydrogen content occurring during the production of thin film solar cells. As a result, it was difficult to improve the performance and stability as well as streamline the production of cell panels. This made the establishment of a technology to analyze and control hydrogen content a highly urgent matter.

With this as a background, Screen and Gifu University have been moving forward with collaborative research on the analysis of thin film silicon solar cells since November 2008. This research has culminated in the world-first*** demonstration of an analysis method for amorphous silicon films, which will be valuable for the production of stable cell panels with minimal generation loss. This method enables the digitization of information that is useful for the accurate control of light-induced degradation – something that had been impossible with conventional technology. These research results are now being incorporated into Screen's spectroscopic ellipsometric film thickness measurement systems as a measurement function. Work is still continuing to commercialize this technology as a world-first device capable of the accurate analysis of film properties, as well as the non-contact, non-destructive measurement of film thicknesses, which has long been a feature of Screen systems.

Thanks to this industry-university cooperative research, Screen and Gifu University have further enhanced the functions of spectroscopic ellipsometric film thickness measurement systems. Both parties are targeting the establishment of a new manufacturing process that will carry forward the solar cell industry and its sudden anticipated growth. At the same time, they are also planning to make further contributions to the development of the international energy industry.

* Mega solar systems

Large-scale solar power generation systems

** Light-induced degradation

Phenomenon in which generation efficiency decreases

*** As of June 2010

Note: This system will be presented in a panel exhibit at PV Japan 2010, a total photovoltaics event to be held at Pacifico Yokohama in Yokohama, Kanagawa from June 30 (Wednesday) to July 2 (Friday), 2010.

Comments from Katsumi Shimaji, Corporate Officer of Dainippon Screen Mfg. Co., Ltd., Deputy General Manager of the Development & Manufacturing Management Division:

Screen entered the solar cell industry in July 2008 as part of a plan to expand our business domains. We also began our collaborative research with Gifu University that November in an effort to strengthen the RE-8000 measurement system for thin film solar cells, the first product we released upon entering the market. We are extremely happy this research has now borne fruit in the form of a world-first technological discovery and we are just as pleased it is leading to the creation of a product equipped with a technology that represents a breakthrough for the thin film solar cell industry. Screen hopes to grow the scale of its solar cell business to five billion yen by 2012 and we strongly believe this system will play a key role as a standard bearer for our business.

Comments from Dr. Shuichi Nonomura, Graduate School of Engineering, Gifu University (Director of Center of Innovative Photovoltaic Systems):

In order to make an active contribution to world environmental and energy problems, at Gifu University, the Center of Innovative Photovoltaic Systems is pushing forward with comprehensive research and development of solar cells. Our research center is particularly interested in publicizing the foundation technologies possessed by the university through collaborations between industry, government, and academia. Through this, we hope to construct energy systems that are friendly to the environment. The results of this current collaborative research were obtained via our center's Solar Cell Module Characterization R&D Group (Director: Prof. Hiroyuki Fujiwara). This group is expected to play a key role in developing technology for evaluating the performance of solar cell modules.

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