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## **MITSUBISHI ELECTRIC BREAKS OWN RECORD WITH WORLD'S HIGHEST CONVERSION EFFICIENCY RATE OF 18.9% FOR MULTI-CRYSTALLINE SILICON PHOTOVOLTAIC CELLS**

**Tokyo, February 18, 2009** – Mitsubishi Electric Corporation (President and CEO: Setsuhiro Shimomura) (TOKYO: 6503) announced today that it has improved its world's highest conversion efficiency rate<sup>1</sup> for a 150 x 150 millimeter practical-size multi-crystalline silicon photovoltaic (PV) cell by 0.3 points from 18.6 percent to achieve a new world record<sup>2</sup> of 18.9 percent<sup>3</sup>.

- 1: Efficiency that solar light energy is converted to direct current electrical energy.
- 2: As of February 18, 2009, based on Mitsubishi Electric's research.
- 3: Results from evaluation by Mitsubishi Electric.

### **Background and Summary of Development**

Production volumes of solar, or PV, systems have been increasing as they have garnered attention as a good source of renewable energy, against the background of increased global environmental awareness. While silicon is an essential component in the wafers used to make PV cells, the supply of silicon has not been able to keep up with demand. This is driving research into the development of thinner wafers that not only use less silicon, but also have improved efficiency and increased electrical output.

In addition to the technology already developed by Mitsubishi Electric to improve the photoelectric conversion efficiency rate in multi-crystalline silicon PV cells, the company has developed a new method to efficiently absorb infrared rays in sunlight, thus achieving a new world record of 18.9 percent.

### **Main Features of the Newly Developed PV Cell**

- 1) *26 percent improved efficiency in utilizing infrared rays with newly developed rear-surface reflection structure*

To increase the photoelectric conversion efficiency rate in PV cells, it is important to absorb and generate electricity efficiently from a wide range of wavelengths in sunlight. Due to the characteristic of crystalline

silicon, which has difficulty in absorbing infrared rays, only roughly half of the infrared rays in sunlight can be used to generate electricity, while the other half is usually lost as heat energy after reaching the rear surface of silicon cells. In particular, the thinner the silicon PV cell is, the more difficult it becomes to absorb infrared rays.

Mitsubishi Electric has succeeded in improving efficiency in utilizing infrared rays by 26 percent compared to the company's previous PV cells, whose development was announced on March 19, 2008. The newly developed PV cell has a rear-surface reflection structure, which reflects infrared rays that reaches its rear surface to allow the cell to absorb more light.

## **2) *Low-reflective honeycomb-textured structure***

To increase the photoelectric conversion efficiency rate in PV cells, it is also important to reduce the amount of light reflected from their front surface to take more sunlight into the cells. This newly developed PV cell adopts the same low-reflective honeycomb-textured structure<sup>4</sup> as the one previously developed by Mitsubishi Electric that achieved a 18.6-percent conversion efficiency rate.

4: A hexagon structure with very small bowl-shaped concaves. This technology partly uses the results of the NEDO commissioned project, R&D of Innovative Next Generation Photovoltaic System Technology.

## **Future Developments**

Mitsubishi Electric will begin introducing this multi-crystal silicon PV cell technology into mass-produced PV modules from fiscal 2011 (April 1, 2010-March 31, 2011).

Mitsubishi Electric also aims to increase output of PV systems by combining this technology with its PV inverters, which have a high energy-conversion efficiency rate. The company intends to continue its R&D to improve efficiency in PV systems, thus contributing to environmental preservation and achieving a sustainable society.

## **Patents**

25 domestic and 4 international patents pending

## **About Mitsubishi Electric**

With over 80 years of experience in providing reliable, high-quality products to both corporate clients and general consumers all over the world, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. The company recorded consolidated group sales of 4,049.8 billion yen (US\$ 40.5 billion\*) in the fiscal year ended March 31, 2008. For more information visit <http://global.mitsubishielectric.com>

\*At an exchange rate of 100 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2008

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