News Release

World's Highest Conversion Efficiency of 26.33% Achieved in a Crystalline Silicon Solar Cell — A World First in a Practical Cell Size —

September 14, 2016
New Energy and Industrial Technology Development Organization (NEDO)
Kaneka Corporation

Kaneka Corporation has achieved in a NEDO project the world's highest conversion efficiency of 26.33% in a practical size (180 cm^2) crystalline silicon solar cell.

This record-breaking result will advance technical development of crystalline silicon solar cells and contribute significantly to reducing the cost of power generation through use of high-efficiency solar cells.

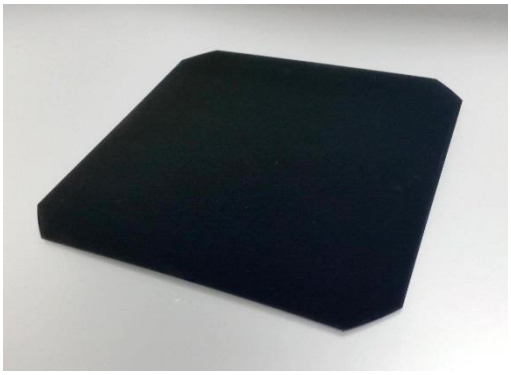

Figure 1. Crystalline silicon solar cell (heterojunction back-contact type)

1. Summary

The levelized cost of electricity (LCOE)[1] using photovoltaic technologies is still high compared with other power generation methods, and cost reduction is a continuous challenge. A number of companies and research organizations around the world have been carrying out technological development to improve the conversion efficiency of solar cells, which will contribute to a considerable reduction in LCOE.

Kaneka Corporation developed a high conversion-efficiency crystalline silicon solar cell (heterojunction back-contact type)[2] in NEDO's Development of High-Performance and Reliable PV Modules to Reduce LCOE project, and has achieved the world's highest[3] conversion efficiency[4] of 26.33% in a crystalline silicon solar cell having a practical size[5] (180 cm^2). This achievement breaks the world record of 25.6% by ~0.7%, exceeding 26% for the first time in the world.

2. Project Results

NEDO and Kaneka Corporation have been working to develop high conversion efficiency crystalline silicon solar cells targeting LCOE reduction. The desired result was achieved by means of a combination of heterojunction technology using high-quality amorphous silicon, low resistance electrode technology, and a back-contact structure that captures more solar energy, all of which were developed by Kaneka Corporation.

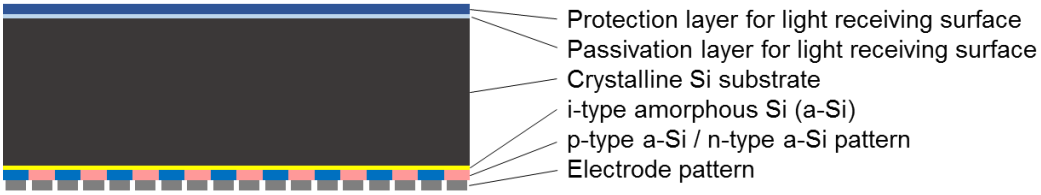

Figure 2. Schematic device structure of record-breaking crystalline silicon solar cell (heterojunction back-contact type)

Improvement in solar cell conversion efficiency will increase electric power generation and lead to a reduction of the cost to introduce photovoltaic power generation systems as less space will be needed to generate the same amount of solar power. Achieving a conversion efficiency of over 26% in crystalline silicon solar cells, which are the most widely used solar cells, will make a great contribution to LCOE reduction and is expected to lead to even more widespread use of photovoltaic power generation in residences which have installation space restrictions.

3. Future Plans

NEDO and Kaneka Corporation will continue to develop solar cell technology for reducing cost and improving performance and reliability to achieve the target electric power generation costs of 14 yen/kWh in 2020 and 7 yen/kWh in 2030.

Kaneka Corporation is planning to commercialize high-efficiency solar cells that utilize the results of NEDO's project and will move ahead with development for practical use.

[Glossary]

1. Levelized cost of electricity (LCOE)

   Levelized cost of electricity (LCOE) is an economic assessment of the average total cost to build and operate a power generation asset over its lifetime divided by the total energy output of the asset over that lifetime.

2. Crystalline silicon solar cell (heterojunction back-contact type)

   A crystalline silicon solar cell is a cell which incorporates heterojunction technology and back-contact technology. Heterojunction technology is technology which binds together plural kinds of semiconductors having different material properties such as combining crystalline silicon with amorphous silicon to reduce defects which lower conversion efficiency or combining materials which convert the light energy of different wavelength ranges into electricity to obtain a higher conversion efficiency. Back-contact technology, which forms electrodes only on the back face of solar cells, can make the light receiving area of the top face larger by gathering up all the electrodes on the back face and as a result enhance conversion efficiency.

3. The world's highest

   As of September 14, 2016, for non-concentration type crystalline silicon solar cells. [Search by Kaneka Corporation]

4. Conversion efficiency of a solar cell

Conversion efficiency is the conversion rate of light energy into electric energy, which is one of the important performance indices for solar cells. The conversion efficiency of 26.33% was measured at the Fraunhofer Institute for Solar Energy Systems (one of the institutes around the world which provides certified measurement of conversion efficiency for solar cells).

5. Having a practical size
   A practical size is an area of a crystalline silicon solar cell commonly used in the market (148 cm^2-246 cm^2).

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