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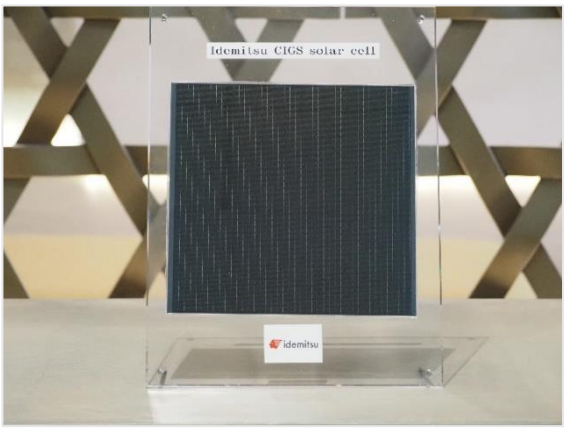
Idemitsu Kosan Co.,Ltd.

Idemitsu Kosan's CIGS Solar Cell for Space Application has been installed on JAXA's new space station resupply vehicle HTV-X1's SDX demonstration system

Idemitsu Kosan Co.,Ltd. (Head Office: Chiyoda-ku, Tokyo; Representative Director and President: Noriaki Sakai; hereinafter referred to as "Idemitsu Kosan") will have its CIGS[*1] Solar Cell[*2] for Space Application installed on the exposed section[*3] of the Next-Generation Space Solar Cell In-Orbit Demonstration "SDX." The demonstration will be conducted by the Japan Aerospace Exploration Agency (JAXA). SDX is one of the demonstrations to be conducted in space by the new HTV-X1 ISS supply vehicle developed by JAXA and will periodically measure the output of the solar panels to verify their normal operation in orbit.

*1: CIGS: A compound semiconductor formed from the initial letters of Cu (copper), In (indium), Ga (gallium), and Se (selenium).
*2: Solar cell: The smallest unit of a solar panel.
*3: Exposed section: The part of a spacecraft that is directly exposed to outer space for conducting experiments or demonstrations.

Conceptual image of technology demonstration using HTV-X1
(C)JAXA



Sample of the CIGS Solar Cell for Space Application developed by Idemitsu Kosan

Scheduled for launch this fall, JAXA's HTV-X1 is a next-generation unmanned resupply spacecraft that inherits and further advances the technology of the "Kounotori" (HTV). Following launch, HTV-X1 will dock with the International Space Station (ISS) and deliver its cargo. After undocking from the ISS, it will conduct various technology demonstration missions while flying in orbit.

One of these technology demonstrations is the "SDX (Space Solar Cell Demonstration System on HTV-X)," which monitors the performance of next-generation space solar cells at an altitude of 300 to 400 km for approximately two months. Outer space is a vacuum with radiation and extreme temperature variations and, even under such harsh conditions, there is a high demand for the development of high-performance solar cells capable of supplying energy to space infrastructures such as resupply vehicles and artificial satellites. Due to its exceptionally high radiation tolerance and its potential to contribute to future cost reductions in the space industry, the CIGS Solar Cell developed by Idemitsu Kosan for space applications was selected for installation on the SDX demonstration

system as part of space solar cell research. Through SDX, Idemitsu Kosan will verify the characteristics and power generation stability of the CIGS Solar Cell for Space Application in the space environment.

The Idemitsu Group has been working to develop new businesses since the oil crisis of the 1970s. The CIGS Solar Cell, which has been under research and development for over 30 years, is one such example. Since 2022, Idemitsu Kosan has consolidated its research and development functions into its Advanced Technology Research Laboratories, where we are tackling the development and commercialization of next-generation solar cells for applications such as use in space. Developed through years of research and development and backed by cumulative mass production exceeding 6 GW of ground-based solar panels, our innovative CIGS Solar Cell for Space Application achieves both high radiation tolerance and lightweight design through our proprietary thin-film technology[*4], and is expected to deliver outstanding performance even in the harsh radiation-filled environment of space. Furthermore, it can self-repair damage caused by radiation, minimizing performance degradation and enabling stable operation and extended lifespan for satellites.

Based on the results of this demonstration, Idemitsu Kosan will accelerate development toward market entry for the CIGS Solar Cell for Space Application, aiming to contribute to sustainable space development.

*4: Thin-film technology: A technology that forms extremely thin films, measured in micrometers, on the surface of base material.

(References)
1. JAXA HTV-X1 Mission
URL：https://humans-in-space.jaxa.jp/en/htv-x/

2. Key Features of Idemitsu Kosan's CIGS Solar Cell for Space Application
URL：https://www.idemitsu.com/en/company/rd/cigs/index.html

(1) Extremely High Radiation Tolerance
The output of silicon (Si) solar cells and gallium arsenide (GaAs) solar cells, commonly used for space applications, declines due to exposure to radiation in outer space. On the other hand, Idemitsu Kosan's CIGS Solar Cell for Space Application can self-repair radiation damage, enabling it to maintain its output over extended periods.

(2) Thin Film and Lightweight Properties
The device layer of Idemitsu Kosan's CIGS Solar Cell is only a few micrometers thick. Furthermore, due to its high radiation tolerance described above, it is also possible to achieve a thin-film, lightweight structure that does not require cover glass for protection from radiation.

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