

Project title

Durability enhancement of high efficiency, low cost, and lightweight perovskite thin film solar cells

Institutions : Toin University of Yokohama, Hyogo University, Kishu Giken Kogyo Co., Ltd., Pecell Technologies Co., Ltd., Ricoh Co., Ltd.

Project outline

Objective

The perovskite solar cell developed by the authors is a next-generation solar cell, attracting worldwide attention due to its excellent features such as low cost, high conversion efficiency of over 20%, high efficiency even under low illumination, and flexibility. However, some drawbacks, such as low durability against temperature, humidity, and light, prevents its usage in practical applications.

This study aims to develop lightweight and thin-film perovskite solar cell modules with high conversion efficiency and high durability in the case of low illumination light. The main application of these devices is in the power supply for sensing devices in IoT.

Contents

- ① High efficiency of perovskite solar cells
The aim is to improve the efficiency under indoor lighting and sunlight by optimizing materials and interfaces.
- ② Improvement of moisture resistance, high-temperature resistance, and life characteristics of perovskite solar cells
The aim is to improve the durability using the results of various durability evaluations in solar cell fabrication.
- ③ Development of perovskite solar cell module
The aim is to develop solar cell modules that reflect the high-efficiency and high-durability studies, as mentioned above.
- ④ Improvement of radiation durability of perovskite solar cells
The aim is to develop solar cells with enough radiation durability for space applications.

[Features of perovskite solar cells]

Low cost (simple manufacturing method, inexpensive material)

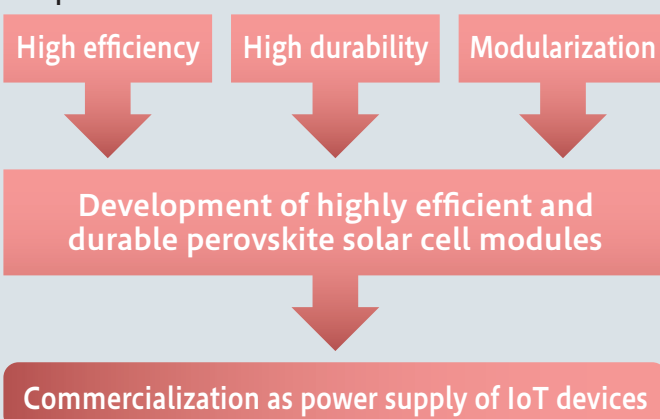
- High conversion efficiency of over 20%
- High conversion efficiency maintained even under low illumination Flexibility

[Problems of perovskite solar cells]

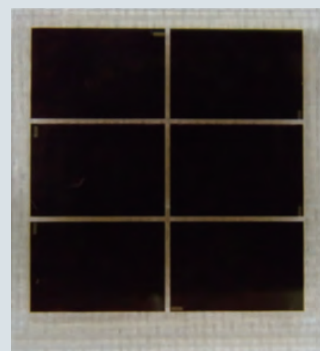
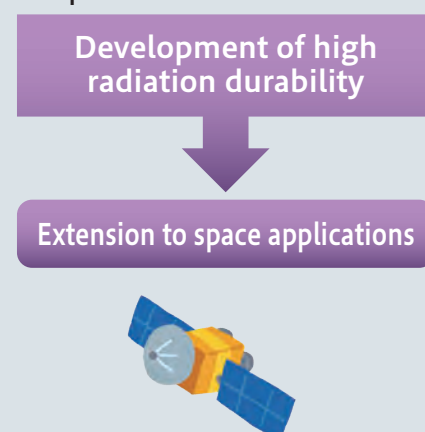
- Low durability against temperature, humidity, and light

Aiming for improvement through durability testing and evaluation technology in the demanding environments of JAXA

<Step 1>



<Step 2>



6 series modules under development