

## 5 接合集光型太陽電池を用いた高効率太陽光水素製造システム

### Efficient Solar-to-hydrogen Conversion System by Using 5-junction Concentrator Photovoltaic Module

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Water splitting powered by direct sunlight is an expected method to produce “green” hydrogen in nowadays’ society which fits the larger needs of renewable energy applications instead of fossil fuels. In this study, a system combined by a five-junction photovoltaic solar cell module and PEM (proton exchange membrane) electrochemical cells was designed and constructed to evaluate the performance of solar-to-hydrogen conversion, achieving a high efficiency record of 28.59% in one minute average in early summer. Measurement data in several days in different weather conditions are analyzed and compared with previous measurement results which achieved its highest at 28.20% in winter. The higher conversion efficiency of solar cell module and good matching between photovoltaic cells and electrolyzers leading to more efficient system performance are revealed and confirmed. These results demonstrate the feasibility of the solar-to-hydrogen conversion system by applying concentrator photovoltaic module in different seasons and its potential in contributing to achieving carbon neutral society.

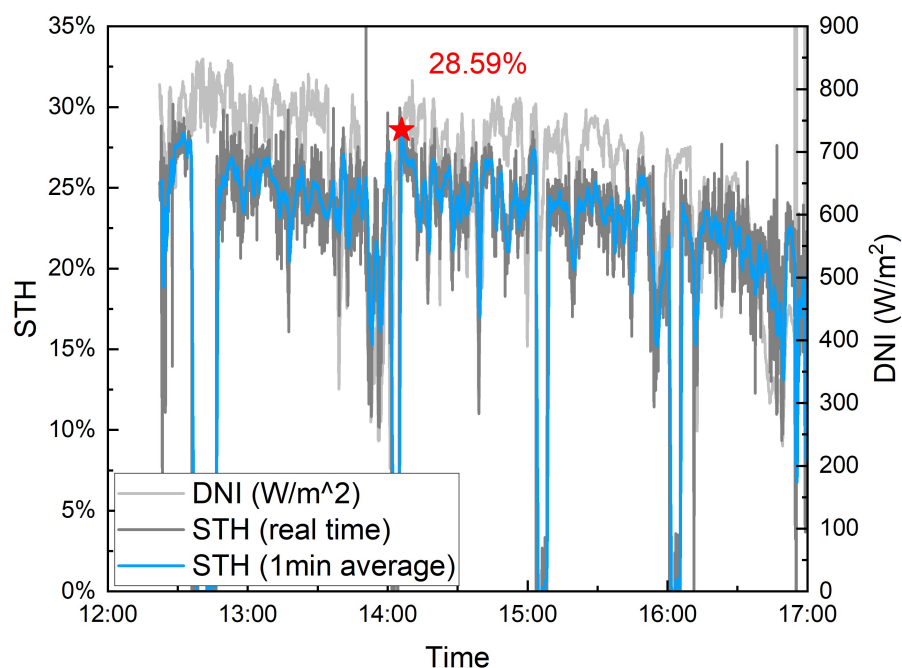


Fig. STH in different time period averages measured in Tokyo in 2022/05/10