

Energy Storage

R&D Project Title : Development of high-performance latent/sensible heat-storage materials for effective utilization of mid- and low-temperature waste heat

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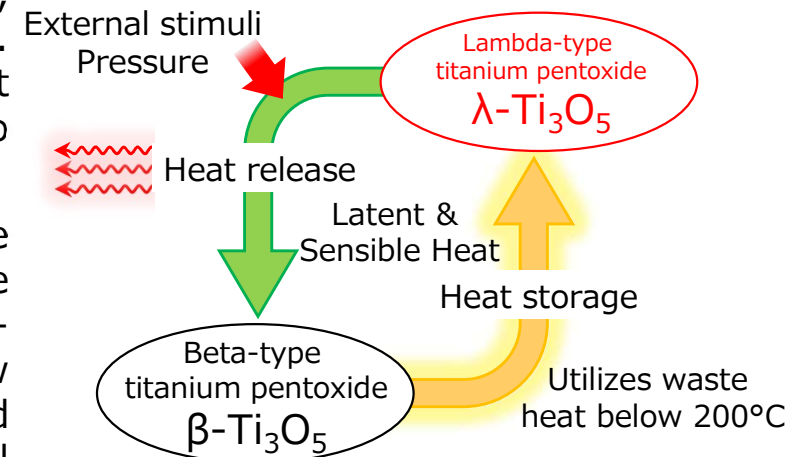
Summary :

The objective of the present project is to develop long-term heat-storage materials to solve the issue commonly found in heat-storage materials, where the accumulated heat energy is naturally released over time. Especially, we aim to develop long-term heat-storage materials that accumulates mid- and low-temperature waste heat below 200 C and to evaluate the performances of these materials for applications.

Research Challenges: Currently, 60-70% of primary energy in Japan are wasted. Collecting and reusing such wasted heat is important from the viewpoint of SDGs. In this project, we will design and develop heat-storage materials that effectively utilizes waste heat at mid and low temperatures. We focus on λ - Ti_3O_5 , a long-term heat-storage ceramic, and further expand the materials to "long-term heat storage materials". We will construct evaluation systems for latent and sensible heat, and investigate various external stimuli. In addition, we will fabricate various processed products, and evaluate the performances on actual devices.

Scenario for Carbon Neutral Contribution: This research aims to contribute to carbon neutrality through the development of long-term heat-storage materials that can store waste heat energy for prolonged period and to establish a new energy recycle system to effectively utilize mid- and low-temperature waste heat.

Development of high-performance latent/sensible heat-storage materials Long-term heat-storage materials



Establish measurement systems Exploration of materials

For application

- Water cooling mechanisms for thermal and nuclear power plants and industrial furnaces
- Heating systems using solar heat
- Prevention of excessive heating (smartphones and other electronic devices)
- Crankshafts for vehicles