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Commercialization and fundamental research of waste heat recovery technology using adsorption heat storage materials

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Abstracts:

Based on the Green ILC concept, an R & D program is underway to recover and utilize thermal energy emitted from the cooling water of ILC facilities.

Iwate Prefecture, where the ILC Kitakami candidate site is located, is 80% mountainous, which is not suitable for online transportation of thermal energy.

In order to effectively utilize the thermal energy emitted from the ILC facilities, a thermal energy circulation model suitable for such regional characteristics is required.

We are aiming to commercialize an off-line waste heat circulation model that utilizes an innovative adsorptive thermal storage material, "HASClay", which can utilize low-grade waste heat of 50-100°C.

So far, we have developed a portable container that can hold approximately 10 kg of dry HASClay and have evaluated its heat storage and emission performance.

On the other hand, one of the issues for practical use is to elucidate the mechanism of water vapor adsorption/desorption on the microstructure of "HASClay".

Here, we discuss two issues: (1) a demonstration test for commercialization of a thermal energy circulation model and (2) basic research to understand the structure and adsorption/desorption mechanism of "HASClay" using synchrotron radiation.

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