

Project Title: Development of Evaluation Methods for Ammonia Adsorption and Desorption Under Extreme Conditions (2024-2027*) *scheduled



Entrusted Party: National Institute of Advanced Industrial Science and Technology

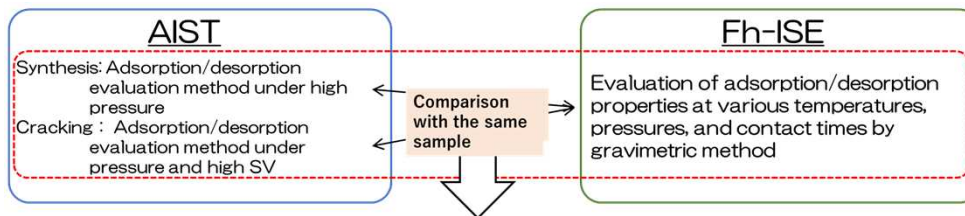
Outline of the Project

Background: Ammonia is separated from other molecules such as hydrogen during the ammonia synthesis and cracking process, and the use of adsorbents for the separation has been considered. However, there are no standardized guidelines for their evaluation.

Objective: In this project, the National Institute of Advanced Industrial Science and Technology (AIST) and the Fraunhofer-Gesellschaft of Germany will each conduct evaluations using the same adsorbent. The goal is to propose an evaluation method that will become a global standard by combining the findings of both organizations.

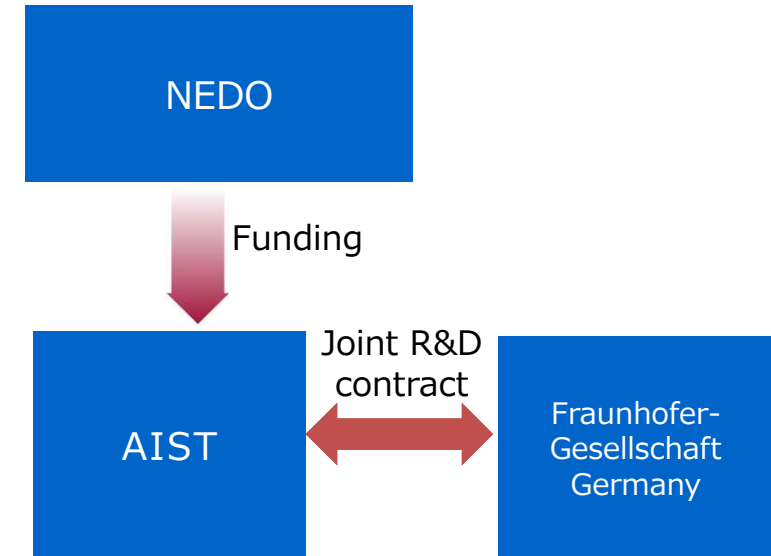
Research and Development:

1. Jointly establish evaluation methods for ammonia adsorption, absorption, and desorption characteristics under high pressures and wide temperature ranges, and under pressurized, high space velocity conditions, to create evaluation guidelines.
2. AIST will search for novel adsorbents that differ from conventional adsorbents and evaluate their properties in light of process requirements.
3. AIST will evaluate how separation and recovery rates of residual ammonia in the ammonia cracking process affect energy efficiency through process simulations.



Proposal of an evaluation method for adsorbents that will become an international standard

Project Scheme



Expected Outcomes

- Large-scale ammonia synthesis and cracking plants are expected to be in operation worldwide by around 2030. Japan will be recognized as a leader in ammonia technology due to the proposed standardizations, leading to enhanced international competitiveness.
- If the use of adsorbents is adopted in large-scale ammonia synthesis processes, a one-percent increase in activation is expected. It is estimated this will have an economic effect of 900 million yen.

Significance of International R&D

Significance of International Joint Research: The Fraunhofer-Gesellschaft is a world-renowned public research organization. By collaborating and releasing results jointly, rather than solely through domestic independent studies, the reliability of this proposal as an international standard will be enhanced.