

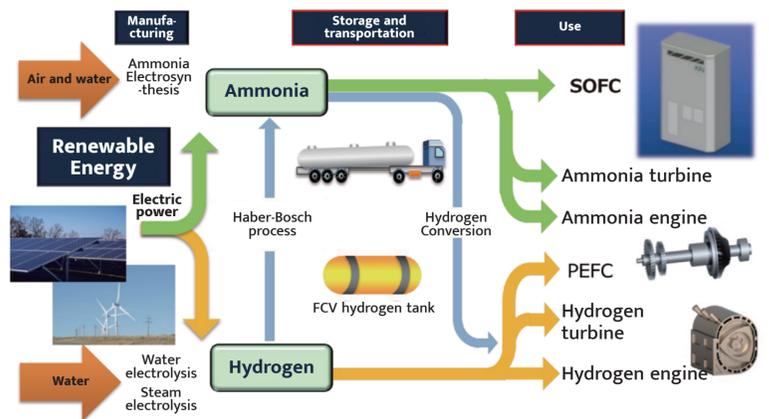
# Ammonia is attracting attention as a hydrogen carrier and carbon-free fuel.

Supporting the development of ammonia fuel for a carbon-neutral society

## Circumstance

### Ammonia is attracting attention as a hydrogen carrier and carbon-free fuel.

- Ammonia is attracting attention as a hydrogen carrier due to its high hydrogen density and ease of transport.
- Using ammonia directly as fuel in SOFCs reduces the energy required for decomposition.
- Research is also underway to extract hydrogen from transported ammonia.



## Development examples of fuel ammonia energy systems

### Hydrogen Carrier

#### Liquid ammonia tank using storage materials

- Searching for storage materials that can store and liquefy ammonia and verifying their storage properties
- Storage methods at room temperature and pressure are currently being considered



Ammonia absorbent

Hiroshima University Collaborative Research

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### Fuel ammonia

#### Direct ammonia fuel cell system

- Confirming power generation characteristics with an SOFC stack
- Prototype system constructed
- Confirming flammability and ignition characteristics



NH<sub>3</sub>/H<sub>2</sub> mixed combustion test



System prototype

Patent 6623030  
Patent 6623031  
Patent 6652866

### Decomposition and synthesis

#### Ammonia decomposition reaction test

- Heating ammonia using a catalyst to extract hydrogen
- Measuring the gas composition after decomposition to determine decomposition efficiency

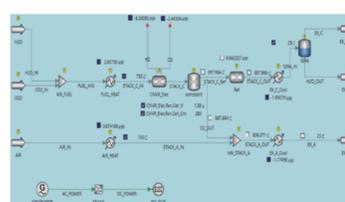


Ammonia Reaction Test Equipment

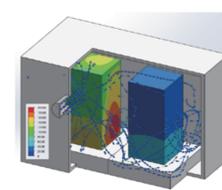
We handle a wide range of ammonia-related developments, from design and prototyping to evaluation using analysis.

- We use process simulators and thermal fluid analysis to calculate and design the optimal heat balance.
- We also handle the design and prototyping of peripheral equipment and control devices such as heaters, gas supply systems, and heat exchangers.

#### Process Simulator



#### Thermal Fluid Analysis



#### Design and Prototyping

