

3rd HTTR WorkSshop  
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# Overview of HTTR Project

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# Features of HTGR

## ■ **Shutdown !**

Increase of fuel and graphite temperatures results in generation of negative reactivity, which decreases reactor power without active control.

## ■ **Cooling !**

Reactor core can be cooled from the outside of the reactor pressure vessel even in loss of coolant.

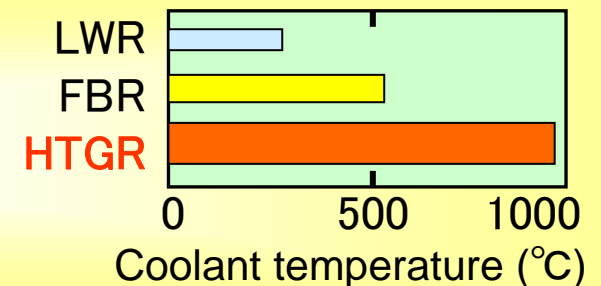
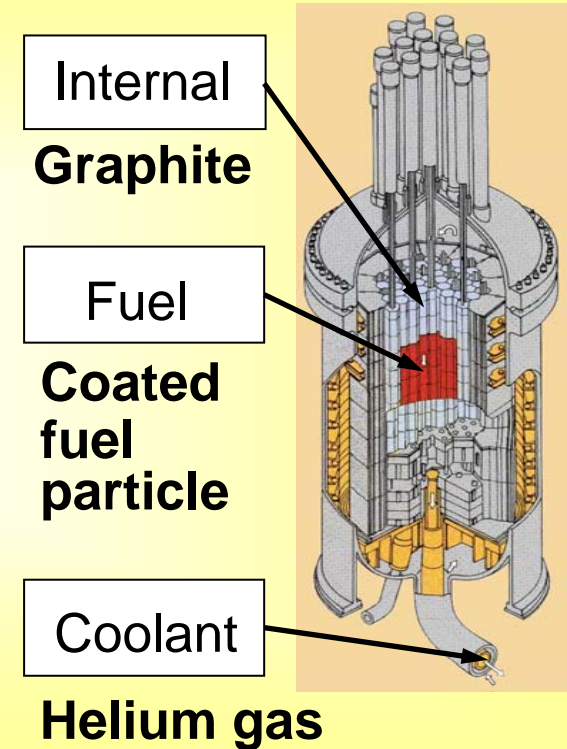
## ■ **Confinement !**

Fourfold ceramics coatings of fuel particles confine fission products even at temperature of 1600°C.

## ■ **High-temperature heat**

makes it possible to generate electricity and to produce hydrogen etc. with **high efficiency**.

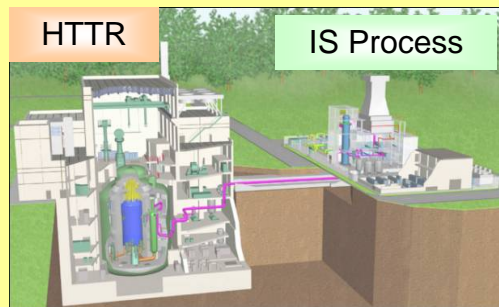
## Structure of HTGR



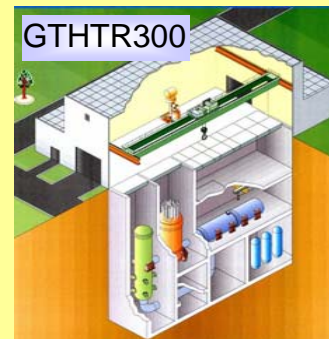
# HTTR Project in JAEA

## ■ Design study

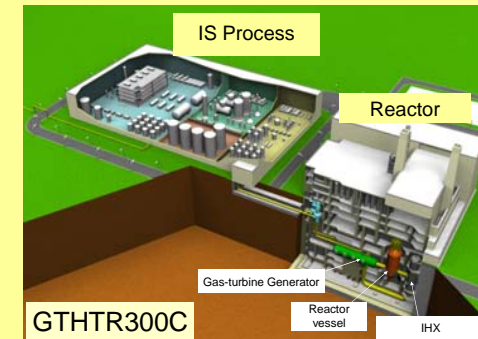
- HTTR IS system



- Power Plant



- Co-generation Plant



## ■ Reactor Technology



- Performance
- Safety
- Fuel & Material
- Irradiation

## ■ Heat Utilization Technology

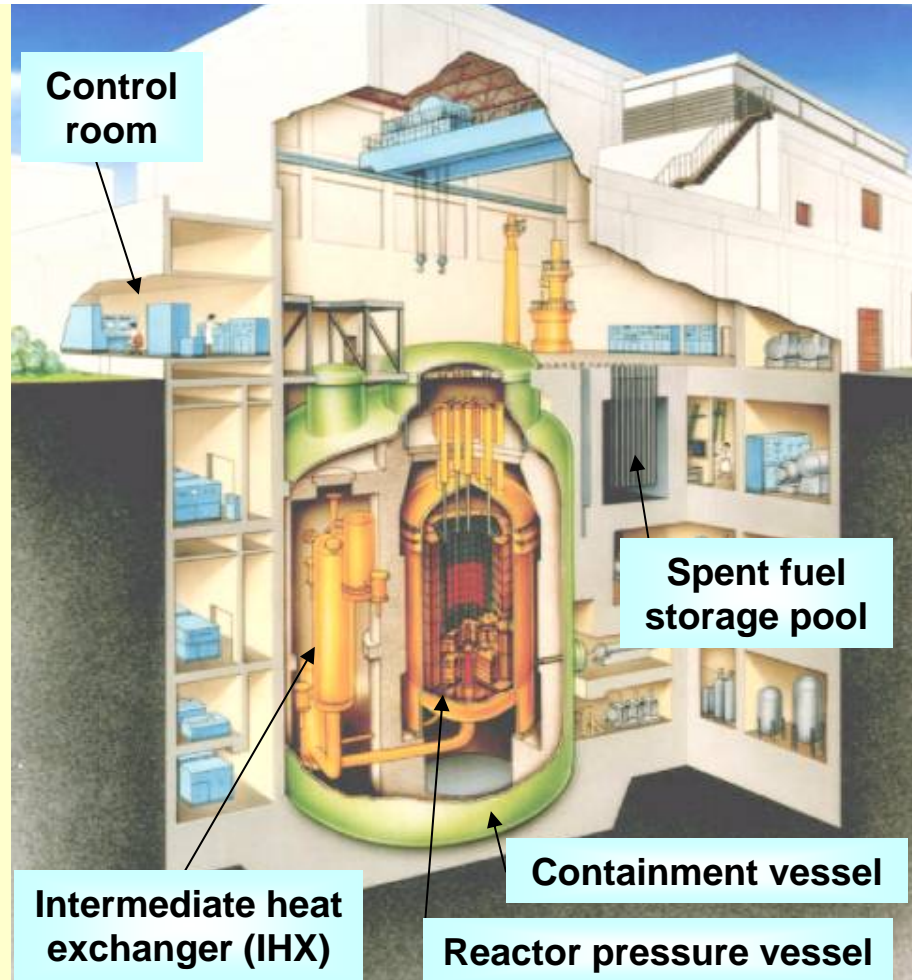


- Thermochemical IS process
- Methane steam reforming
- Gas turbine
- System integration

# High Temperature Engineering Test Reactor (HTTR)

## HTTR

Graphite-moderated/helium gas-cooled HTGR



## Major specification

Thermal power	30 MW
Fuel	Coated fuel particle / Prismatic block type
Core material	Graphite
Coolant	Helium
Inlet temperature	395 °C
Outlet temperature	950 °C (Max.)
Pressure	4 MPa

## History

- First criticality : 1998
- Full power operation : 2001
- High temperature operation (950°C) : 2004

# Future Plan of HTTR Project

## Reactor Technology (HTTR)

- Attainment of reactor-outlet coolant temperature of 950°C (April, 2004)
- Safety demonstration test
- Improvement of fuel and materials

## Hydrogen Production Technology IS Process

- Completion of 1 week continuous hydrogen production (Jun, 2004)
- Improvement of system efficiency
- Pilot test (under planning)

## System Integration

- Safety evaluation
- Isolation valve tests

## HTGR Plant Design and Gas Turbine Technology

- Design of GTHTR300 and GTHTR300C
- Tests of compressor, magnetic bearing etc.



Hydrogen Production with HTTR-IS System (1000m<sup>3</sup>/h)

## Commercial HTGR System

Hydrogen production for commercial use in 2020s

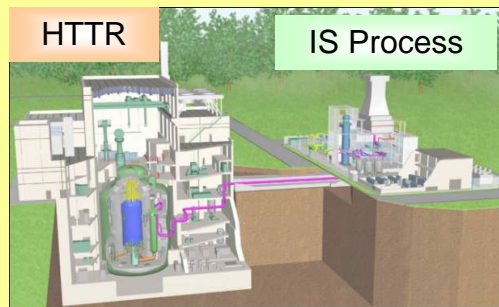




# Today's Presentations

## ■ Design study

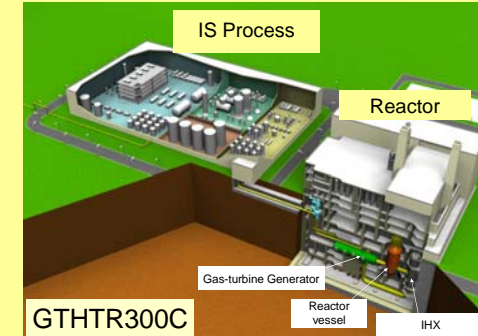
- HTTR IS system



- Power Plant



- **Co-generation Plant**



## ■ Reactor Technology



- **Performance**
- **Safety**
- **Fuel** & Material
- Irradiation

## ■ Heat Utilization Technology



Bench-scale IS Process

- Thermochemical IS process
- Methane steam reforming
- Gas turbine
- System integration