

Uranium recovery from NaDU scrap

● PROCESS
ENGINEERING
DEPT.
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This process is to separate uranium from NaDU scrap generated when cleaning UF₆ cylinder.

* Necessity

- KNF's unique front end cycle technology and plant are needed
- Indispensable to UF₆ cylinder cleaning process

* Process Constitution

- This process consists of 4 unit processes : Conversion, Dissolution, Precipitation, L/S separation
 - Conversion : Converting sodium diuranate to acid-soluble form
 - Dissolution : Making UN solution by dissolving the converted scrap in nitric acid
 - Precipitation : Making AUH slurry by adding reactant gases into UN solution
 - L/S separation : Making AUH powder by filtration and drying of AUH slurry
- The final product is impure AUH powder : Fed to Uranium purification process after pre-treatment

Description

* Purpose

- To produce AUH ready to be utilized in Fuel Fabrication by separating Uranium from sodium diuranate containing scrap (NaDU scrap)

* Principle

- Conversion · Dissolution : NaDU scrap is converted to soluble form by reaction with reactant gases at appropriate temperature and dissolved with nitric acid to produce UN solution.
- Precipitation : UN solution reacts with reactant gases to precipitate as AUH slurry to separate uranium.



Distinctiveness

* Characteristics

- Exclusively developed unit process : more eco-friendly compared to other institutions' processes
- Comparison with the existing other institutions' processes

	KNF process	Other process(1)	Other process(2)
Unit process	Conversion-Dissolution-Precipitation-Separation	Dissolution-Acidification-Precipitation-Separation	Dissolution-Acidification-Precipitation-Separation
Liquid waste	15 ton/tonU	40 ton/tonU	40 ton/tonU
U content in filtrate	1 ppm	10 ppm	20 ppm

* Benefits

- Less radioactive waste
- Cost reduction in purchasing uranium by recovery and reuse
- Transfer plant technology

Experience

- Process developing
 - Lab scale experiment and process model are completed
 - Pilot scale experiment is scheduled
- Commercial plant construction(plan) : Max. 5 tonU/yr

Deliverables

- Product : UO₂ powder [with Uranium purification and AUH reconversion processes]
- Technical services : Plant EPC

TECHNOLOGY READINESS LEVEL(TRL)

- Component validation in relevant environment

BUSINESS MODEL

Technology Transfer

Licensing

Joint search

Service Execution

Others