

[Form 2 (to be reported to Committee on Countermeasures for Contaminated Water Treatment and to be disclosed to public)]

Technology Information	
Area	2 (Select the number from "Areas of Technologies Requested")
Title	Technology for treatment of tritium-contaminated water
Submitted by	Prof. Rozenkevich (MUCTR), Tadamasa Fujimura
<p>1. Overview of Technologies (features, specification, functions, owners, etc.)</p> <p>Nowadays CECE process (The Combined Electrolysis and Catalytic Exchange) is the most effective technology for water detritiation. CECE-process has found its application in detritiation systems of some nuclear stations. This technology permits to work over big water flows with high efficiency (process speed 10-400 kg/day for contaminated water of 4-500 MBq/kg, which is decontaminated to 74 kBq/kg) . . The main specialty of this process is the use of hydrophobic catalyst, which was developed at MUCTR. MUCTR is an implementer and patent-holder for such a catalyst. The catalyst is granules of 0.8 ~ 1.0 mm in diameter with specific surface area of 300 m²/g, lifetime of more than 20 years, and catalysis activity ratio of 15 s⁻¹. The reactor column is packed in special alternate layers of catalyst/ packing. The other characteristic feature of this process is the necessity of using electrolyzer as a bottom node of flow circulation. For target set-up by IRID according to our preliminary calculations, it is necessary to build a complex of facilities (plant) whose energy consumption will be around 85 MWatt for detritiation of 400 ton/day. The real energy consumption of the whole plant will be about 200 MWatt. The necessary volume of the catalyst is 20 m³ which contains 50 kg of platinum (Pt).</p>	
<p>2. Notes (Please provide following information if possible.)</p> <ul style="list-style-type: none"> - Technology readiness level (including cases of application, not limited to nuclear industry, time line for application) <p>The technology is used for detritiation of heat transfer agent in some nuclear reactors (CANDU), however with different catalysis. The catalyst and the packing (material and structure) of the H-T exchange column have been developed at Mendeleyev University.</p> <p>The technology has been used for more than 20 years at Mendeleyev University of Chemical Technology of Russia, and the catalyst is also used at Nuclear Physics Institute (Saint Petersburg, Russian Academy) and several other places in Russia.</p> <p>In the implementation of the technology, Joint venture can be formed including Japanese major company.</p> <ul style="list-style-type: none"> - Challenges <p>Needless of water chemical purification step before detritiation.</p>	

- Others (referential information on patent if any)
Technology of detritiation of water RU 2060801
Technology of preparation of Pt-catalyst RU 2307708

【Areas of Technologies Requested】

- (1) Accumulation of contaminated water (Storage Tanks, etc.)
- (2) Treatment of contaminated water (Tritium, etc.)
- (3) Removal of radioactive materials from the seawater in the harbor
- (4) Management of contaminated water inside the buildings
- (5) Management measures to block groundwater from flowing into the site
- (6) Understanding the groundwater flow