

## **Application of Membrane Dehumidifier for Gaseous Tritium Recovery in LHD**

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In order to realize the planned deuterium plasma experiments using the Large Helical Device (LHD), the National Institute for Fusion Science (NIFS) is planning to install a system for tritium recovery from exhaust gas. While adopting typical tritium recovery systems, NIFS has also made plans for the development of a compact reduced-waste recovery system by applying a membrane type dehumidifier. The applicability of a commercially available membrane dehumidifier has been evaluated experimentally, with the results indicating such a membrane is feasible for practical application. Based on performance test results, the optimum specifications of the membrane dehumidifier are evaluated quantitatively.

As the next step, we have carried out the basic design of the actual tritium recovery system having the treatment capacity of 300 m<sup>3</sup>(STP)/h. In this system, the wet outlet air (purge gas) of the membrane dehumidifier is returned to the inlet of the feed pump and dehydrated under compressed condition. Continuous wet purge gas recycling operation between the membrane dehumidifier and the feed pump under various flow conditions is the key function in this tritium recovery system.

So, we have just constructed the small test apparatus having the capacity of 1/10 (30m<sup>3</sup>/h) and applying the same flow control system as the actual tritium recovery system. Specifications of the test apparatus and the performance test results will be presented in the meeting.