

The background levels of atmospheric tritium and OBT at NIFS Toki site of Japan

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National Institute for Fusion Science has a plan of the deuterium plasma experiment by the Large Helical Device (LHD), which is a large heliotron type superconducting magnetic fusion test device. Although the tritium produced by D-D reaction will be very small, a part of tritium would be released into the environment. It is required to monitor the environmental tritium not only to secure the safety but also to get consents of the local residents. Also it is important to grasp the background levels of the environmental tritium before the deuterium plasma experiments. Measurements had been done for atmospheric tritium, and tissue-free water tritium (TFWT) and organically bound tritium (OBT) of pine tree in and around the NIFS Toki site.

Major chemical forms of the atmospheric tritiated gas are water vapor (HTO), hydrogen gas (HT) and methane (CH₃T), of which discharge concentrations from a controlled area are limited by regulation law. In order to distinct the chemical forms of tritium, the atmospheric hydrogen elements of hydrogen gas and methane were converted to water form by two different oxidation catalyses and the water was trapped respectively into molecular sieve absorber columns. The air sampling had been done every month by an automatic sequential system. Then the tritium concentrations in recovered water were measured with a low background liquid scintillation counter.

Also TFWT and OBT of pine needles were analyzed. Sampling of the pine needles had been done every 3 month. Then 4 samples collected in 1 year were analyzed. After the samples were dried to obtain the TWTF, the dried pine needles including the OBT were burned to change to the water form. Then tritium in the water was measured with a low background liquid scintillation counter. In the present study, these environmental tritium concentrations in recent years will be evaluated and will be made discussion.