

## **Evaluation of hydrogen isotope oxidation process in an atmospheric pressure plasma**

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Oxidation is an important process for detritiation and purification of hydrogen isotope. There are several methods for collecting tritium such as an oxidation method using catalysts, an absorption and so on. However, it is difficult to treat a large amount of tritium in low cost and without warm up time.

In this paper, hydrogen isotope oxidation process by using atmospheric pressure plasma generated by 2.45 GHz microwave discharge has been studied. Atmospheric pressure nitrogen or argon was used as an operational gas. In order to evaluate the quantity of the oxidation, small amount of hydrogen and oxygen were mixed in the operational gas during the plasma discharge, and then change of ratio of the gas components was measured by a Quadruple Mass Spectrometer, where hydrogen was used instead of tritium in this experiment.

The experimental results indicate that oxidation of hydrogen is possible using the atmospheric pressure plasma. The rate of hydrogen oxidation is increased when increasing the input microwave power. In addition, the conversion rate during the nitrogen discharge is higher than that in the argon plasma. Influence of gas flow rate on the oxidation will be also discussed.