Contribution ID: **551** Type: **not specified**

P4.216 A Plan of Purification System for Lithium Loop of Advanced Fusion Neutron Source

Thursday, 20 September 2018 11:00 (2 hours)

A purification system for lithium loop is one of critical issues to design the accelerator-driven (IFMIF-type) fusion neutron source. It is written in IFMIF Intermediate Engineering Design Report that the levels of non-metallic impurities such as nitrogen, oxygen, carbon, hydrogen isotopes and tritium should be less than 10, 10, 10, 10 and 1 wt.ppm, respectively, although there is little basis reported. To achieve the above impurities levels, especially nitrogen and hydrogen isotopes including tritium, it takes long time for purification before the main operation which generate neutron, and the data for these purification systems are so far insufficient to make an execution drawing. Therefore, a purification plan of lithium loop for Advanced Fusion Neutron Source (A-FNS) is suggested for early realization of A-FNS in Japan as below. In the suggested plan, the impurities levels of nitrogen and hydrogen isotopes including tritium are eased to 400 and 80 wt.ppm, respectively, while oxygen and carbon are the same as above. It is considered that the problems of nitrogen impurities would be plugging and erosion/corrosion, and those of hydrogen isotopes be plugging and tritium inventory in lithium. However, it is considered that the plugging would not be brought about, and the erosion/corrosion and the tritium inventory would not become critical to the lithium loop system under the operation temperature between 523 to 573 K and under the suggested impurities level. As the results, it is found that only a cold trap system for the purification system is necessary at first, and the hot trap system including nitrogen trap and hydrogen trap would become necessary after 4 or 5 years operation. That is, the adoption of the present suggestion could bring 4 to 5 years extension for the completion of the purification system in the execution drawing.

Presenter: OYAIDZU, Makoto (Department of Fusion Reactor Materials Research National Institutes for Quantum and Radiological Science and Technology)

Session Classification: P4