



Contribution ID: 760

Type: **not specified**

P2.189 The plan of continuous tritium recovery campaign by PbLi droplets in vacuum

Tuesday, 18 September 2018 11:00 (2 hours)

Practical plan of “continuous tritium recovery by PbLi droplets in vacuum” campaign is introduced. This campaign aims to verify the viability of tritium recovery method by PbLi droplets in vacuum as a prototype design level. Following verifications are to be performed. 1) To verify the steady state extraction efficiency of tritium from a vacuum sieve tray for 1.1 mm diameter droplet. Predicted extraction efficiency from the previous experiments is higher than 80%. 2) To verify the mutual interference effect by multiple nozzles on degrading extraction efficiency. Extraction efficiencies by simultaneous 7 nozzles ejection and by 19 nozzles are verified. No major influence, even though, is predicted by previous analysis. 3) To verify the reliability of the vacuum sieve tray in continuous operation. At least 48 hours of non-stop operation is primary goal of this trial. A dedicated extraction system is designed, fabricated and installed into the “Oroshhi-2; PbLi experimental loop at National Institute for Fusion Science (NIFS)”, Toki, Japan. Followed by the stand-alone test with short flowing period at Kyoto University, the experiment will be installed in the Oroshhi-2 in late 2018. Deuterium, instead of tritium, is used for the experiment. Extraction efficiency is calculated by comparing the deuterium concentration of before-drop and after-drop by measuring the permeating amount through the test tube wall. The amount of released deuterium is also measured and verified with the before-and-after concentration change. PbLi temperature is between 400°C and 500°C, and the flow velocity at the nozzle is 3 m s⁻¹. Initial experiment is scheduled in March 2019.

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Session Classification: P2