Status of LBE corrosion test loop "OLLOCHI" and experimental plan at JAEA

S. Saito#, T. Wan, N. Okubo, H. Obayashi and T. Sasa

J-PARC Center, JAEA, Tokai, Ibaraki 319-1195, Japan

 # a corresponding author: E-mail saito.shigeru@jaea.go.jp

An Accelerator Driven System (ADS) for waste transmutation investigated in Japan Atomic Energy Agency (JAEA) employs lead-bismuth eutectic (LBE) as a neutron production target material and coolant. The neutrons are to be produced via the spallation with 1.5 GeV proton beam injection. As materials irradiation data are important for ADS development, JAEA plans to construct an irradiation facility with LBE neutron production target in J-PARC [1]. There are many technical issues on LBE for practical use because of insufficient experiences. In particular, corrosion data of relevant materials like T91 (Mod. 9Cr-1Mo) and SS316L steels at 400-550℃, which is assumed to be the operation temperature of ADS, under flowing condition are indispensable. Then JAEA has designed and built a new LBE corrosion test loop named “OLLOCHI (Oxygen-controlled LBE LOop Corrosion tests in HIgh-temperature)”, to obtain the corrosion data at the higher temperature [2]. The purposes of the loop are as follows; (1) corrosion data accumulation under ADS condition, (2) investigation of liquid metal embrittlement (LME), (3) investigation of flow accelerated corrosion (FAC) [3], (4) establishment of oxygen sensor and oxygen concentration control technology, and (5) development of purification system for LBE. OLLOCHI is now in the conditioning operation phase with LBE, and the oxygen control test has been started. Ultrasonic flow meters have been installed in main flow pipe and test sections. In parallel, thermal hydraulic analysis in the expansion tank has performed to identify the temperature and thermal stresses in both the tank and specimen holders.

In this paper, the results of the conditioning operations and experimental plan for corrosion studies will be presented.

References

[1] Technical Design Report on J-PARC Transmutation Experimental Facility -ADS Target Test Facility (TEF-T) -, (in Japanese) JAEA-Technology 2017-003 (2017).

[2] S. Saito, *et al.*, Proc. of TCADS-3, NEA/NSC/R(2017)2, pp. 195-200 (2017).

[3] T. Wan and S. Saito, Metals 8, 627, pp. 1-22 (2018/8).
https://doi.org/10.3390/met8080627.