PRESENT STATUS OF JAPANESE TASKS FOR LITHIUM TARGET FACILITY UNDER IFMIF/EVEDA

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International Fusion Materials Irradiation Facility (IFMIF) is the most important facility for the development of the fusion materials, and Engineering Validation and Engineering Design Activities (EVEDA) of IFMIF have been carried out from July in 2007 as one of the three projects in the Broader Approach Agreement. IFMIF consists of the three major systems, namely Accelerator, Lithium(Li) Target and Test Facilities, and the function of the Lithium Target system is mainly to keep the steady flow of the liquid lithium with 20 m/s under the deuterium irradiation with 10 MW.

In IFMIF/EVEDA, tasks for Lithium Target System are shared to 5 validation tasks(LF1-5) and a design task(LF6). The purpose of LF1 task is to construct and operate the EVEDA Lithium Test Loop with diagnostics and purification systems, and LF1 is the biggest task in the Li Target Tasks. JAEA has a main responsibility to the performance of the Li Test Loop. Japanese universities are contributing on the construction of the diagnostics and purification system of lithium containing nitrogen and hydrogen. ENEA in Italy is also contributing on the Bayonet concept for the Back Plate. The construction of the Li Test Loop started at the beginning of 2010 and will be finished before the end of next February. LF2 is a task for the diagnostics of the Li Test Loop and IFMIF design. Basic research for the diagnostics equipment has been completed, and the construction for the Li Test Loop will be finished before March in 2011. LF3 is a task for the erosion/corrosion but Japanese side has no contribution. LF4 is a task for the purification systems with nitrogen and hydrogen. Basic research for the purification equipment has been completed, and the construction of the nitrogen system for the Li Test Loop will be finished before March in 2011. LF5 is a task for the remote handling system with the Target Assembly. Two concepts, namely Bayonet and Lip Seal, are applied for the Target Assembly. JAEA has an idea to use the laser beam for cutting and welding of the lip part of the flanges. Tensile strength and microstructure measurement of the welded metal at room temperature have been done as a basic research. In 2010, tensile strength will be measured at the range of the covering the IFMIF Li Target operation temperature, for example 400 °C. The experiments of cutting and welding will be performed in 2011. LF6 is a task for the design of the IFMIF based on the validation experiments of LF1-5. Some of the thermal structure analysis have been done, but there are not so much performances before now. This activity will gradually increase to the end of IFMIF/EVEDA.

This paper will describe the present status of the Japanese tasks for the Li Target Facilities under the IFMIF/EVEDA.