INVESTIGATION ON THE TPR PREDICTION ACCURACY IN BLANKET NEUTRONICS EXPERIMENTS WITH REFLECTOR AT JAEA/FNS

K. Kondo[1], T. Yagi[2], K. Ochiai[1], S. Sato[1], K. Takakura[1], S. Ohnishi[1], C. Konno[1]

[1] *Fusion Research and Development Directorate, Japan Atomic Energy Agency*
[2] *Graduate School of Energy Science, Kyoto University*

Corresponding author: kondo.keitaro@jaea.go.jp

In a blanket neutronics experiment with a ^{6}Li-enriched Li_2TiO_3 layer and a beryllium layer conducted in 2003 at the FNS facility of Japan Atomic Energy Agency, the calculated tritium production rate (TPR) overestimated the measured one by approximately 10% as shown in Fig. 1, only when a neutron source reflector composed of SS316 was attached [1]. On the other hand, the influence of the reflector on the TPR prediction accuracy was not seen in our recent blanket experiment with a natural Li_2TiO_3 layer, beryllium layers and the reflector [2]. We had investigated the former experiment in detail, and found an unphysical tendency in the measured TPR distribution. In order to clarify whether the deterioration of the TPR prediction accuracy originates from the reflector or not, we have conducted the same experiment as the previous experiment in 2003 again. The TPR distribution inside the ^{6}Li-enriched Li_2TiO_3 layer was measured with Li_2CO_3 pellet detectors. In this experiment, various experimental conditions, such as a density, thickness and ^{6}Li content of Li_2CO_3 pellets, source strength of DD neutrons as well as DT neutrons, were carefully confirmed. The results showed that the measured TPR well agreed with the calculated one within an estimated experimental error of 6% as shown in Fig. 1. We now conclude that the overestimation of TPR observed in the previous experiment would be due to some mistakes, and the TPR prediction accuracy is good even with the reflector.

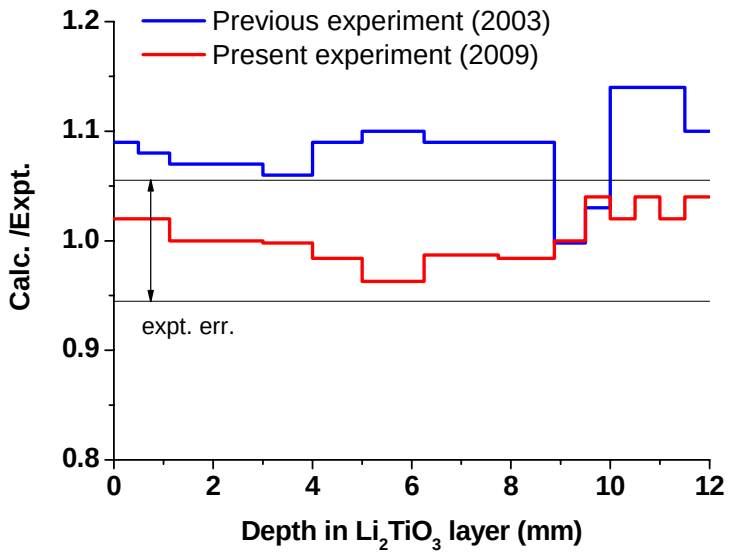

Figure 1: Ratio of calculated to experimental value (C/E) of TPR in the Li_2TiO_3 layer

[1] S. Sato et al., Fusion Sci. Technol., 47, 2005, 1046–1051.
[2] K. Kondo et al., Fusion Eng. Des., in press, http://dx.doi.org/10.1016/j.fusengdes.2010.03.009