

Study on tritium release behavior from Li_2ZrO_3

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The present authors have developed an estimation model to represent the tritium release behavior from solid breeder materials which is valid for out-of-pile and in-pile conditions. The tritium release curves estimated by this tritium release model give good agreements with experimental curves from the solid breeder candidates under various purge gas conditions [1].

It has been certified during above model construction that the considerable amount of adsorbed water and water produced by the water formation reaction are released to the purge gas when the purge gas including hydrogen is applied. It is confirmed that a part of bred tritium is released as HTO when water exists in the purge gas. Then, the adequate countermeasures are required from a viewpoint of effective tritium recovery.

In this study, the amount of adsorbed water and the capacity of water formation reaction and its release rate of Li_2ZrO_3 , which is considered as one of the solid breeder candidates, are quantified. It is found in this experiment that Li_2ZrO_3 has the largest adsorption amount and water formation capacity among the solid breeder candidates. It is also found in this experiment that Li_2ZrO_3 has a large capacity of water formation reaction at around 823K. Tritium release behavior from Li_2ZrO_3 blanket is estimated using the properties obtained in this study under the operational condition of ITER or a commercial reactor.