Contribution ID: **1229** Type: **not specified**

P3.182 Effects of Pre-Dissociations of HTO and H2 on Tritium Recovery Rate of Purge Gas Flow in Tritium Breeding Blanket

Wednesday, 19 September 2018 11:00 (2 hours)

Tritium recovery rate is one of most important parameters to design highly efficient fuel cycle in fusion reactors. To estimate the tritium recovery rate accurately, chemical reactions in the tritium recovery process must to be studied in detail. In solid type breeding blankets, tritium is expected to be released from the breeder pebbles in the form of HTO into purge gas surrounding the pebbles. The released tritium is then extracted mainly in the form of HT produced as a result of chemical reactions with H2 highly diluted in helium in the purge gas flow. In our previous study, we have studied the chemical kinetics of HTO+H2 -> H2O+HT reaction by the transition state theory. The results show that the activation energy of this reaction is relatively high, and the reaction rate is small for operational temperature ranges of Helium Cooled Ceramic Reflector (HCCR) Test Blanket Module (TBM), adopted as a solid breeder blanket for the study, implying the necessity of further investigation of other reaction paths to produce HT efficiently.
In the present paper, the effects of pre-dissociations of H2 and HTO on the production of HT are studied by quantum chemistry. Firstly, the chemical kinetics of the dissociation of H2 and HTO is studied. Then, possible reaction pathways to produce HT are studied. Finally, the chemical reaction rate coefficients of the HT production reactions are presented.

Presenter: AHN FURUDATE, Michiko (Dept. of Mechatronics Engineering Chungnum National University)

Session Classification: P3