

## **Analysis of tritium transport behaviors in CN HCCB test blanket system**

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A helium cooled ceramic breeder (HCCB) test blanket module as well as its ancillary systems developed by China will be integrated into ITER device. During ITER operation phase, considerable amount of tritium will be generated inside the module by neutron-lithium reaction and then be purged out and processed by dedicated sub-systems.

In order to achieve anticipated scientific objectives and control system safety at the same time, the behaviours of tritium transportation in different parts of the system need to be studied and predicted carefully during system design phase.

In this paper, behaviors include tritium permeation through module structure materials and pipe walls which are governed by concentration gradient and temperature gradient, transportation in helium coolant and in helium purge gas, trapping in solid materials and recombination in surfaces are studied. Boundary conditions are determined based on these studies. The system is modeled in simplified 1D and 2D forms for simulation. By solving diffusion equations, tritium concentrations in different locations are calculated and preliminary assessed.