

Tritium Research Program for Fusion Reactor Applications

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A tritium research program, allocated to Dankook University as a part of fusion reactor engineering R&D program launched by participating universities in Korea, is introduced. The goal of this program is to establish an experimental database for handling tritium in a fusion reactor environment and to develop relevant tritium technologies. As an initial step, a program for the tritium permeation study was started in collaboration with CARFRE(Center for Advance Research in Fusion Reactor Engineering at Seoul National University) and NFRI(National Fusion Research Institute in Korea). An experimental system for hydrogen-isotopes permeation and related behaviors in thin-solid materials has been designed and constructed. A continuous flow method is adopted with a capacity of high temperatures up to $\sim 1,000^{\circ}\text{C}$ under high vacuums of $\sim 10^{-9}\text{Torr}$. The permeation behavior of hydrogen in various materials including stainless steels is investigated at a temperature range from 400°C to 800°C . The permeation dependency on pressure is also investigated. As a result, the permeabilities, diffusion coefficients and solubilities of hydrogen are determined. The results are compared with the previously existing reference data.

"This work was supported by the Korea Science and Engineering Foundation(KOSEF) grant funded by the Korea government(MEST)(No. 20090063359)."