Contribution ID: **137** Type: **Poster**

FTP/P7-10: Performances of Helium, Neon and Argon Glow Discharges for Reduction of Fuel Hydrogen Retention in Tungsten, Stainless Steel and Graphite

Friday, 12 October 2012 08:30 (4 hours)

It is quite important to investigate the performance of glow discharge conditionings for controls of in-vessel tritium inventory and hydrogen recycling. For this purpose, first, the deuterium retentions in tungsten (W), graphite (C) and stainless steel (SS) were measured. The retention in W was not small as expected, several times larger than that of SS, although the retention in SS was one order smaller than that of C. Such the large retention in W is owing to the growth of rough surface structure produced by the plasma irradiation. For reduction of deuterium retention in W, SS and C, second, inert gas (He, Ne, Ar) glow discharges were conducted and these performances were compared. The removal ratio was highest in He discharge, and lowest in Ar discharge. These values are well explained by the numerical analyses using SRIM code. The removal ratios for SS and C were significantly large, but the ratio for W was quite small. This reason is owing to the rough surface structure in W. For W, thirdly, the hydrogen isotope exchange and the wall baking experiments were conducted. It is found that the wall baking with a temperature higher than 700 K can well reduce the retention, and the hydrogen isotope exchange using glow discharge is also useful to replace the fuel hydrogen retention in the wall. The present results significantly contribute to evaluate the fuel hydrogen retention and to reduce the in-vessel tritium inventory in fusion reactors.

Country or International Organization of Primary Author

Hokkaido University, Japan

Primary author: Mr HINO, Tomoaki (Japan)

Co-authors: Mr MATASUMOTO, A (Hokkaido University); Prof. NISHIMURA, K (National Institute for Fusion Science); Mr KIMURA, Y (Hokkaido University); Prof. UEDA, Y (Osaka University); Dr YAMAUCHI, Yuji (Hokkaido University)

Presenter: Mr HINO, Tomoaki (Japan)

Session Classification: Poster: P7

Track Classification: FTP - Fusion Technology and Power Plant Design