§52. Hydrogen Retention Properties of SiC Converted Graphite

Hino, T., Yamauchi, Y., Hirohata, Y., Yamashina, T. (Hokkaido Univ.)
Noda, N., Sagara, A., Kubota, Y., Inoue, N., Tsuzuki, K., Motojima, O.

In order to suppress the hydrogen recycling and the chemical erosion of plasma facing walls, the use of siliconization or SiC coated graphite has been proposed. The hydrogen retention properties of these materials, however, have not been investigated. In this study, the hydrogen retention properties of SiC converted graphite was examined.

SiC coated graphite sample was irradiated by hydrogen ion with an energy of 1.7 keV. After that, the hydrogen desorption spectrum was obtained by thermal desorption spectroscopy (Fig. 1). The amount of the retained hydrogen was comparable with that of graphite. In addition to the peak due to C-H bond, a low temperature peak due to Si-H bond appeared. The baking temperature required becomes ~700 °C, 100 °C lower than that of graphite.

After the hydrogen ion irradiation, the helium ion irradiation was conducted to reduce the amount of the retrained hydrogen. The hydrogen trapped in form of Si-H bond was largely reduced (Fig. 2). The reduction ratio of the totally retained hydrogen was approximately ~40 %.

The present data may be useful to consider the LHD wall conditioning scheme.

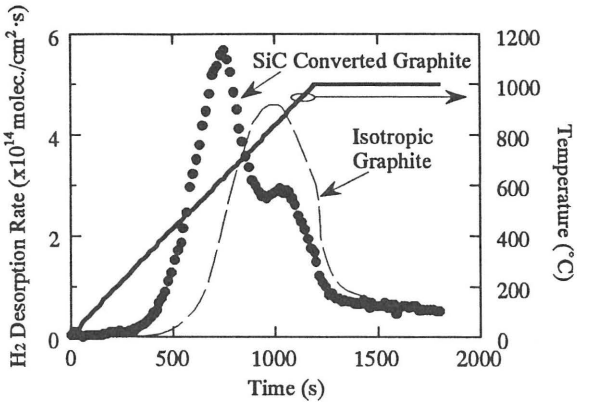

Fig. 1 Hydrogen desorption spectra of SiC converted graphite and isotropic graphite.

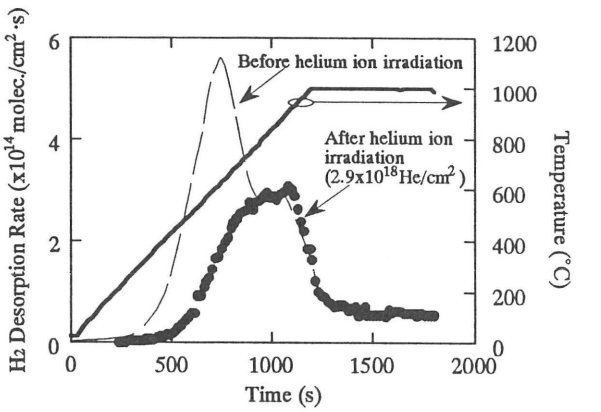

Fig. 2 Hydrogen desorption spectra of SiC converted graphite before and after the helium ion irradiation.

References

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2) Yamauchi, Y., Hino, T., Koyama, K., Hirohata, Y. and Yamashina, T., "Hydrogen retention properties of low Z and high Z plasma facing materials", To be submitted to J. Nucl. Mater (1996).