High Temperature Outgassing Tests on Materials Used in the DIII-D Tokamak*

K.L. Holtrop and M.J. Hansink
General Atomics

This paper is a continuation of previous work on determining the outgassing characteristics of materials used in the DIII-D magnetic fusion tokamak [1]. In order to achieve high performance plasma discharges in the DIII-D tokamak, impurity levels must be carefully controlled. Among the techniques used to control impurities are routine bakes of the vacuum vessel to an average temperature of 350^{o}C. Materials used in DIII-D must not release any impurities at this temperature that could be transferred to the first wall materials and contaminate plasma discharges. To better study the behavior of materials proposed for use in DIII-D at elevated temperatures the initial outgassing test chamber was modified to include independent heating control of the sample and a simple load-lock chamber. The goal was to determine not only the total outgassing rate of the material under test but to also determine the gas species composition and to obtain a quantitative estimate of the removal rate of each species by the use of a residual gas analyzer. Initial results for aluminum anodized using three different processes, stainless steel plated with black oxide and black chrome, and a commercially available fiber optic feedthrough will be presented.

[1] K. Holtrop, J. Vac. Sci. Technol. A **17**, 2064 (1999).

*This work was supported by the US Department of Energy under DE-FC02-04ER54698.