Collateral effects of thermo-oxidation on DIII-D in-vessel components and first results from the in situ oxidation in DIII-D

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Abstract

Thermo-oxidation has the advantage of being able to remove tritium from carbon-based codeposits on all internal surfaces without mechanical intervention into the torus. (i) Ex situ experiments: In preparation for a thermo-oxidation experiment in DIII-D, the collateral effects of thermo-oxidation were studied for a variety of in-vessel components in ex situ laboratory experiments. Specimens were oxidized in 10 Torr (~1.333 kPa) dry air at a specimen temperature of 350°C (623 K) for 2 h. After oxidation, components were examined for visual change. For some of the components, surface analysis was also performed before and after oxidation. (ii) DIII-D oxidation: Initial assessment of the impact of in situ oxidation in DIII-D was based on operational tests and visual inspection of materials specimens inserted into the vessel on stalks. Tokamak systems tested (wave heating components, cryopump systems) worked as expected during the subsequent plasma recovery.

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