Thermal Oxidation Experiments Aimed at Understanding Tritium Recovery Based on $^{13}$C-Tracer Experiments in DIII-D, JET, C-Mod, and MAST*

P.C. Stangeby,1 S.L. Allen,2 N. Bekris,3 N.H. Brooks,4 J.P. Coad,5 G.F. Counsell,6 J.W. Davis,1 J.D. Elder,1 M.E. Fenstermacher,2 M. Groth,2 A.A. Haasz,1 J. Likonen,7 B. Lipschultz,8 A.G. McLean,1 V. Philippa,9 G.D. Porter,2 D.L. Rudakov,10 W.R. Wampler,11 J.G. Watkins,11 W.P. West,4 and D.G. Whyte12

1University of Toronto Institute for Aerospace Studies, Toronto, Canada
2Lawrence Livermore National Laboratory, Livermore, California 94550, USA
3Forschungszentrum Karlsruhe, Eggenstein-Leopoldshafen, Germany
4General Atomics, P.O. Box 85608, San Diego, California 92186-5608, USA
5EFDA-JET, Culham Science Center, Abingdon, United Kingdom
6EURATOM/UKAEA, Culham Science Center, Abingdon, United Kingdom
7EURATOM-Tekes, Helsinki, Finland
8Massachusetts Institute of Technology, Cambridge, Massachusetts, USA
9Forschungszentrum Jülich GmbH EURATOM-Association, Jülich, Germany
10University of California-San Diego, La Jolla, California, USA
11Sandia National Laboratories, Albuquerque, New Mexico, USA
12University of Wisconsin-Madison, Madison, Wisconsin, USA

Retention of tritium in carbon co-deposits is a serious concern for ITER. Developing a reliable in-situ removal method of the co-deposited tritium would allow the use of carbon plasma-facing components which have proven reliable in high heat flux conditions and compatible with high plasma performance. Thermal oxidation is a potential solution, capable of reaching even hidden locations. It is necessary to establish the least severe conditions to achieve adequate tritium recovery, minimizing damage and reconditioning time. The first step in this international project is $^{13}$C-tracer experiments in DIII-D, JET, C-Mod and MAST. $^{13}$CH$_4$ is injected toroidally symmetrically, facilitating quantification and interpretation of the results. Tiles are then removed, analyzed for $^{13}$C content and subsequently evaluated in a thermal oxidation test facility with regard to the ability of different severities of oxidation exposure to remove the different types of (known and measured) $^{13}$C co-deposit. Removal of D/T from B on Mo tiles from C-Mod will also be tested. OEDGE interpretive code analysis of the $^{13}$C deposition patterns is used to generate the understanding needed to apply findings to ITER. First results are reported for the $^{13}$C injection experiments in DIII-D.

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