

Fusion Science and Technology

VOLUME 71 · NUMBER 1 · JANUARY 2017

Special Issue on Measuring and Modeling of Plasma-Material Interactions

Contents

iii Preface

Karl D. Hammond, Davide Curreli, Brian D. Wirth, David N. Ruzic

TECHNICAL PAPERS

- 1 Growth Rate Effects on the Formation of Dislocation Loops Around Deep Helium Bubbles in Tungsten

Luis Sandoval, Danny Perez, Blas P. Uberuaga, Arthur F. Voter

- 7 Simulation of Helium Behavior Near Subsurface Prismatic Dislocation Loops in Tungsten

Karl D. Hammond, Francesco Ferroni, Brian D. Wirth

- 22 Modeling Helium Segregation to the Surfaces of Plasma-Exposed Tungsten as a Function of Temperature and Surface Orientation

Sophie Blondel, Karl D. Hammond, Lin Hu, Dimitrios Maroudas, Brian D. Wirth

- 36 Dynamics of Small Mobile Helium Clusters Near a Symmetric Tilt Grain Boundary of Plasma-Exposed Tungsten

Lin Hu, Karl D. Hammond, Brian D. Wirth, Dimitrios Maroudas

- 52 Properties of Vacancy Complexes with Hydrogen and Helium Atoms in Tungsten from First Principles

G. D. Samolyuk, Y. N. Osetsky, R. E. Stoller

- 60 Kinetic Monte Carlo Simulations of Helium Cluster Nucleation in Tungsten with Preexisting Vacancies

Zhangcan Yang, Sophie Blondel, Karl D. Hammond, Brian D. Wirth

- 75 Modeling of Multispecies Dynamics in Fusion-Related Materials with FACE

R. D. Smirnov, J. Guterl, S. I. Krasheninnikov

- 84 Benchmarks and Tests of a Multidimensional Cluster Dynamics Model of Helium Implantation in Tungsten

Sophie Blondel, David E. Bernholdt, Karl D. Hammond, Lin Hu, Dimitrios Maroudas, Brian D. Wirth

—continued—

Contents continued

VOLUME 71 · NUMBER 1 · JANUARY 2017

- 93** Dynamic Coupling of Boltzmann Plasma Model to Surface Erosion Model for Kinetic Treatment of Plasma-Material Interactions
S. Keniley, D. Curreli

- 103** Sensitivity of the Boundary Plasma to the Plasma-Material Interface
J. M. Canik, X.-Z. Tang

TECHNICAL NOTES

- 110** Plasma Power Recycling at the Divertor Surface
Xian-Zhu Tang, Zehua Guo

- 122** A Molecular Dynamics Study of Subsurface Hydrogen-Helium Bubbles in Tungsten
Z. J. Bergstrom, M. A. Cusentino, B. D. Wirth