

## TABLE OF CONTENTS

<b>1</b>	<b>FERRITIC/MARTENSITIC STEEL DEVELOPMENT</b>	
<b>1.1</b>	<b>PERFORMANCE EVALUATION OF MODIFIED 3Cr-3WVTa BAINITIC STEELS—Y. Yamamoto (Oak Ridge National Laboratory)</b>	<b>1</b>
<b>1.2</b>	<b>NANOPRECIPITATE STABILITY UNDER ELEVATED TEMPERATURE AND IRRADIATION IN A NOVEL ADDITIVELY MANUFACTURED STEEL—T.M. K. Green, Kevin G. Field (University of Michigan)</b>	<b>4</b>
<b>1.3</b>	<b>MICROHARDNESS MEASUREMENT UPDATES FOR SELECTED SSJ3 SPECIMENS IN F8B1/2, F11B3, RB15J, AND RB19J CAPSULES—X. Chen, J. Reed, C. On, J.W. Geringer, Y. Katoh (Oak Ridge National Laboratory)</b>	<b>7</b>
<b>1.4</b>	<b>DEUTERIUM RETENTION COMPARISON FOR HIGH AND LOW CARBON FUSION BLANKET STRUCTURAL MATERIALS—W. Zhong, L. Tan, Y. Katoh (Oak Ridge National Laboratory)</b>	<b>9</b>
<b>2</b>	<b>ODS AND NANOCOMPOSITED ALLOY DEVELOPMENT</b>	
<b>2.1</b>	<b>ODS FeCrAl PRODUCTION USING ADDITIVE MANUFACTURING WITH IN SITU OXIDATION—T. Austin, S. J. Zinkle (University of Tennessee), N. Sridharan (Lincoln Electric)</b>	<b>12</b>
<b>2.2</b>	<b>PRELIMINARY PROGRESS IN COLD SPRAY OF GARS ODS STEEL POWDER ON A FERRITIC MARTENSITIC STEEL SUBSTRATE—D. Zhang, K. A. Ross, J. T. Darsell, L. Li, D. J. Edwards, W. Setyawan (Pacific Northwest National Laboratory)</b>	<b>19</b>
<b>3</b>	<b>CERAMIC COMPOSITE STRUCTURAL MATERIAL DEVELOPMENT</b>	
<b>3.1</b>	<b>CHARACTERIZATION OF ATOMIC-SCALE DEFECTS IN NEUTRON IRRADIATED SILICON CARBIDE—T. Koyanagi, Y. Katoh (Oak Ridge National Laboratory), X. Hu (Sichuan University), D. Sprouster (Stony Brook University)</b>	<b>22</b>
<b>3.2</b>	<b>X-RAY CHARACTERIZATION METHODS FOR BERYLLIDE-BASED MATERIALS FOR MULTIPLIER APPLICATIONS—D. Bhardwaj, D.J. Sprouster, J. R. Trelewicz, L.L. Snead (Stony Brook University)</b>	<b>25</b>
<b>4</b>	<b>PLASMA-FACING AND HIGH HEAT FLUX MATERIALS AND COMPONENT TESTING</b>	
<b>4.1</b>	<b>PROPERTIES AND CHARACTERIZATION OF THE 2<sup>nd</sup> GENERATION OF Cu-Cr-Nb-Zr ALLOYS FOR FUSION ENERGY APPLICATIONS—Y. Yang, L. Wang (Oak Ridge National Laboratory), S. Zinkle (University of Tennessee), L. Snead (Stony Brook University)</b>	<b>27</b>

## TABLE OF CONTENTS

<b>4.2</b>	<b>ON THE ROLE OF ANNEALING ON MICROSTRUCTURE AND MECHANICAL PROPERTIES OF 90 to 97W TUNGSTEN HEAVY ALLOYS—M.E. Alam, G.R. Odette (University of California Santa Barbara)</b>	<b>30</b>
<b>4.3</b>	<b>UPDATE ON THE INFLUENCE OF SPECIMEN SIZE AND GEOMETRY ON THE FRACTURE TOUGHNESS OF TUNGSTEN HEAVY METAL ALLOYS—M.E. Alam, G.R. Odette (University of California, Santa Barbara)</b>	<b>48</b>
<b>4.4</b>	<b>TRANSPORT PROPERTY EVALUATION OF NEUTRON IRRADIATED TUNGSTEN MATERIALS FROM THE PHENIX AND SHINE CAMPAIGNS—J. R. Echols, L. M. Garrison, Y. Katoh (Oak Ridge National Laboratory)</b>	<b>63</b>
<b>4.5</b>	<b>PROGRESS REPORT ON RE-STARTING HOT-ROLLING AND CONTINUED CHARACTERIZATION OF TUNGSTEN HEAVY ALLOY AT PNNL—J. Wang, R. Prabhakaran, C. H. Henager, Jr., W. Setyawan (Pacific Northwest National Laboratory)</b>	<b>69</b>
<b>4.6</b>	<b>STATUS OF THE ELEVATED TEMPERATURE MECHANICAL TEST FACILITY SETUP AT PNNL—R. Prabhakaran, J. Wang, C. H. Henager, Jr., W. Setyawan (Pacific Northwest National Laboratory)</b>	<b>78</b>
<b>4.7</b>	<b>METHOD DEVELOPMENT AND PREPARATION OF TUNGSTEN FIBERS FOR IRRADIATION—L. M. Garrison (Oak Ridge National Laboratory), J. Riesch (IPP-Garching)</b>	<b>84</b>
<b>4.8</b>	<b>CHARACTERIZATION OF DISCONNECTION CONTENT ASSOCIATED WITH GRAIN BOUNDARY MOTION IN TUNGSTEN—I. S. Winter, T. Frolov, T. Oppelstrup, R. E. Rudd (Lawrence Livermore National Laboratory)</b>	<b>96</b>
<b>4.9</b>	<b>TRANSMISSION ELECTRON MICROSCOPY ANALYSIS OF A HEAVY ION IRRADIATED TUNGSTEN HEAVY ALLOY—J. V. Haag IV, M. Murayama (Virginia Tech), M. J. Olszta, D. J. Edwards, W. Jiang, W. Setyawan (Pacific Northwest National Laboratory)</b>	<b>98</b>
<b>4.10</b>	<b>CHARACTERIZATION OF HELIUM CAVITIES IN He<sup>+</sup> ION IRRADIATED DUCTILE-PHASE TOUGHENED TUNGSTEN—W. Jiang, L. Kovarik, K. Kruska, W. Setyawan (Pacific Northwest National Laboratory)</b>	<b>105</b>
<b>4.11</b>	<b>NEUTRON IRRADIATION-ENHANCED GRAIN GROWTH IN TUNGSTEN AND TUNGSTEN ALLOYS—H. Gietl, T. Koyanagi, Y. Katoh (Oak Ridge National Laboratory), X. Hu (Sichuan University), M. Fukuda (National Institutes for Quantum Science and Technology), A. Hasegawa (Tohoku University)</b>	<b>111</b>
<b>5.0</b>	<b>ADVANCED MANUFACTURING</b>	
<b>5.1</b>	<b>FABRICATION OF CERAMIC AND METAL MATRIX ENHANCED SHIELD THROUGH DIRECT CURRENT SINTERING—J.M. Gentile, B. Cheng, D.J. Sprouster, J. R. Trelewicz, L.L. Snead (Stony Brook University)</b>	<b>112</b>

## TABLE OF CONTENTS

<b>6.0</b>	<b>EFFECTS OF IRRADIATION</b>	
<b>6.1</b>	<b>UPDATE ON CAVITY EVOLUTION IN TEMPERED MARTENSITIC STEELS UNDER DUAL ION-BEAM IRRADIATION—T. Yamamoto, G. R. Odette (University of California, Santa Barbara), Y. Du, K. Yoshida (Tohoku University), K. Yabuuchi (Kyoto University)</b>	<b>119</b>
<b>6.2</b>	<b>THE DEPTH DEPENDENT ALPHA PRIME DISTRIBUTION IN Fe18Cr AFTER ION IRRADIATIONS—Y. Zhao, S. J. Zinkle (University of Tennessee), A. Bhattacharya (Oak Ridge National Laboratory)</b>	<b>125</b>
<b>6.3</b>	<b>APT STUDY ON THE FORMATION OF CHROMIUM-ENRICHED PRECIPITATES IN DUAL-ION IRRADIATED Fe-14Cr FERRITIC ALLOYS—Y. Lin, A. Bhattacharya (Oak Ridge National Laboratory), S. J. Zinkle, Y. Zhao (University of Tennessee)</b>	<b>131</b>
<b>6.4</b>	<b>RESPONSE OF CANDIDATE FUSION BLANKET MATERIALS TO DUAL AND TRIPLE ION IRRADIATION TO UNDERSTAND THE SYNERGIES BETWEEN H, He AND RADIATION DAMAGE—L. N. Clowers, Z. Jiao, G. S. Was (University of Michigan)</b>	<b>135</b>
<b>6.5</b>	<b>TENSILE PROPERTIES OF HFIR IRRADIATED F82H VARIANTS AND ODS STEELS SHOW IRRADIATION HARDENING AND LOSS OF DUCTILITY—A. Bhattacharya, J. Reed, D.T. Hoelzer, J.W. Geringer (Oak Ridge National Laboratory), H. Tanigawa, T. Nozawa (QST), S.M. Levine, S.J. Zinkle (University of Tennessee)</b>	<b>141</b>
<b>7.0</b>	<b>PLASMA MATERIAL INTERACTIONS</b> <i>No contributions this reporting period.</i>	
<b>8.0</b>	<b>CORROSION AND COMPATIBILITY IN FUSION SYSTEMS</b>	
<b>8.1</b>	<b>LIQUID METAL COMPATIBILITY OF PRE-OXIDIZED FeCrAl IN FLOWING Sn—B. A. Pint, M. Romedenne (Oak Ridge National Laboratory)</b>	<b>147</b>
<b>8.2</b>	<b>LIQUID METAL COMPATIBILITY OF SiC AND ALUMINIZED F82H IN FLOWING PbLi—M. Romedenne, B. A. Pint (Oak Ridge National Laboratory)</b>	<b>153</b>
<b>9.0</b>	<b>MODELING AND COMPUTATIONAL STUDIES</b>	
<b>9.1</b>	<b>THE EFFECTS OF IRRADIATION ENHANCED THERMAL SOFTENING AND He RE-HARDENING ON THE CREEP PROPERTIES OF 9Cr TEMPERED MARTENSITIC STEELS—M.E. Alam, T. Yamamoto, G.R. Odette (University of California, Santa Barbara)</b>	<b>162</b>
<b>9.2</b>	<b>CALCULATION OF DEPTH DEPENDENT ACTIVATION ENERGY BARRIERS OF TRAP MUTATION REACTIONS IN W(110) SURFACE—G. Nandipati, K. J. Roche, R. J. Kurtz, W. Setyawan (Pacific Northwest National Laboratory), K. D. Hammond (University of Missouri), D. Maroudas (University of Massachusetts), B. D. Wirth (University of Tennessee)</b>	<b>171</b>

**TABLE OF CONTENTS**

<b>9.3</b>	<b>PREDICTIVE MODELS FOR MECHANICAL PROPERTIES OF OXIDE DISPERSION STRENGTHENED ALLOYS</b> —B. N. Nguyen, W. Setyawan (Pacific Northwest National Laboratory)	<b>175</b>
<b>9.4</b>	<b>PREDICTIVE MODELING OF HE BUBBLE ACCUMULATION IN NANOSTRUCTURED FERRITIC ALLOYS</b> —K. C. Pitike, W. Setyawan (Pacific Northwest National Laboratory)	<b>179</b>
<b>9.5</b>	<b>CASCADE SIMULATIONS IN DUCTILE-PHASE TOUGHENED TUNGSTEN</b> —W. Setyawan (Pacific Northwest National Laboratory)	<b>183</b>
<b>10</b>	<b>IRRADIATION AND TESTING ANALYSIS, METHODS, EXPERIMENTS, AND SCHEDULES</b>	
<b>10.1</b>	<b>FUSION 2021 FRONTIER TASK 1 IRRADIATION CAPSULE DESIGN</b> —N. Russell, A.M. Schrell, P. Champlin (Oak Ridge National Laboratory)	<b>187</b>
<b>10.2</b>	<b>FUSION 2021 FRONTIER TASK 3 IRRADIATION CAPSULE DESIGN</b> —N. Russell (Oak Ridge National Laboratory)	<b>190</b>
<b>10.3</b>	<b>IRRADIATION OF QST F82H TENSILE AND BEND BAR SPECIMENS IN HFIR</b> —N. Russell, C. On, X. Chen, J. W. Geringer (Oak Ridge National Laboratory)	<b>192</b>
<b>10.4</b>	<b>HFIR IRRADIATION EXPERIMENTS</b> —C. On, J. W. Geringer, J. L. McDuffee (Oak Ridge National Laboratory)	<b>194</b>
<b>10.5</b>	<b>CLUSTER ANALYSIS OF COMBINED EDS AND EBSD DATA TO SOLVE AMBIGUOUS PHASE IDENTIFICATIONS</b> —C. M. Parish (Oak Ridge National Laboratory)	<b>197</b>
<b>10.6</b>	<b>HIGH ENERGY SMALL-ANGLE X-RAY SCATTERING CAPABILITY DEVELOPMENT AT THE NSLS-II FOR FUSION ENERGY MATERIALS RESEARCH</b> —D.J. Sprouster, J.R. Trelewicz, L.L. Snead (Stony Brook University), D. Olds, A.M.M. Abeykoon (Brookhaven National Laboratory)	<b>198</b>