

## Contents

### Proceedings of the 11th International Conference on Fusion Reactor Materials (ICFRM-11)

Contents Parts A and B . . . . .	vii		
<b>Part A</b>			
<b>Section 1. Invited papers</b>			
Japanese policy on the science and technology research, <i>H. Imura</i>	1		
The present status and future prospects of the ITER project, <i>Y. Shimomura</i>	5		
Materials to deliver the promise of fusion power – pro- gress and challenges, <i>E.E. Bloom, S.J. Zinkle and</i> <i>F.W. Wiffen</i>	12		
The European integrated materials and technology programme in fusion, <i>R. Andreani, E. Diegele, R.</i> <i>Laesser and B. van der Schaaf</i>	20		
ITER nuclear components, preparing for the construc- tion and R&D results, <i>K. Ioki, M. Akiba, P. Bar-</i> <i>abaschi, V. Barabash, S. Chioocchio, W. Daenmer, F.</i> <i>Elio, M. Enoeda, K. Ezato, G. Federici, A. Gervash,</i> <i>D. Grebennikov, L. Jones, S. Kajjura, V. Krylov, T.</i> <i>Kuroda, P. Lorenzetto, S. Maruyama, M. Merola, N.</i> <i>Miki, M. Morimoto, M. Nakahira, J. Ohmori, M.</i> <i>Onozuka, V. Rozov, K. Sato, Yu. Strebkov, S. Suzuki,</i> <i>V. Tanchuk, R. Tivey and Yu. Utin</i>	31		
Recent results of the reduced activation ferritic/marten- sitic steel development, <i>S. Jitsukawa, A. Kimura, A.</i> <i>Kohyama, R.L. Klueh, A.A. Tavassoli, B. van der</i> <i>Schaaf, G.R. Odette, J.W. Rensman, M. Victoria and</i> <i>C. Petersen</i>	39		
Recent progress on development of vanadium alloys for fusion, <i>R.J. Kurtz, K. Abe, V.M. Chernov, D.T.</i> <i>Hoelzer, H. Matsui, T. Muroga and G.R. Odette</i>	47		
Issues and advances in SiC <sub>f</sub> /SiC composites development for fusion reactors, <i>B. Riccardi, L. Giancarli, A.</i> <i>Hasegawa, Y. Katoh, A. Kohyama, R.H. Jones and</i> <i>L.L. Snead</i>	56		
Materials for the plasma-facing components of fusion reactors, <i>H. Bolt, V. Barabash, W. Krauss, J. Linke,</i> <i>R. Neu, S. Suzuki, N. Yoshida and ASDEX Upgrade</i> <i>Team</i>	66		
Major results of the cooperative program between JAERI and universities using plasma facing materi- als in JT-60U, <i>N. Miya, T. Tanabe, M. Nishikawa, K.</i> <i>Okuno, Y. Hirohata and Y. Oya</i>			74
Analysis of defect structural evolution in fcc metals ir- radiated with neutrons under well defined boundary conditions, <i>T. Yoshiie, Y. Satoh and Q. Xu</i>			81
Observation and analysis of defect cluster production and interactions with dislocations, <i>S.J. Zinkle and Y.</i> <i>Matsukawa</i>			88
Determination of effective charge states for point ra- diation defects in fusion ceramic materials, <i>A.I.</i> <i>Ryazanov, A.V. Klaptsov, C. Kinoshita and K. Yasuda</i>			97
Multiscale modeling of radiation damage in Fe-based alloys in the fusion environment, <i>B.D. Wirth, G.R.</i> <i>Odette, J. Marian, L. Ventelon, J.A. Young-Vander-</i> <i>sall and L.A. Zepeda-Ruiz</i>			103
Present status of beryllide R&D as neutron multiplier, <i>H. Kawamura, H. Takahashi, N. Yoshida, Y. Mis-</i> <i>hima, K. Ishida, T. Iwadachi, A. Cardella, J.G. van der</i> <i>Laan, M. Uchida, K. Munakata, Y. Sato, V. Shesta-</i> <i>kov and S. Tanaka</i>			112
Recent progress in the development of electrically insulating coatings for a liquid lithium blanket, <i>B.A. Pint, P.F. Tortorelli, A. Jankowski, J. Hayes,</i> <i>T. Muroga, A. Suzuki, O.I. Yeliseyeva and V.M.</i> <i>Chernov</i>			119
Performance of functional materials and components in a fusion reactor: the issue of radiation effects in ceramics and glass materials for diagnostics, <i>M.</i> <i>Decreton, T. Shikama and E. Hodgson</i>			125
The manufacturing technologies of the European breeding blankets, <i>A. Cardella, E. Rigal, L. Bedel,</i> <i>Ph. Bucci, J. Fiek, L. Forest, L.V. Boccaccini, E.</i> <i>Diegele, L. Giancarli, S. Hermsmeyer, G. Janeschitz,</i> <i>R. Lässer, A. Li Puma, J.D. Lulewicz, A. Möslang, Y.</i> <i>Poitevin and E. Rabaglino</i>			133
Superconducting magnet system in a fusion reactor, <i>K.</i> <i>Okuno, A. Shikov and N. Koizumi</i>			141
Materials and design of the European DEMO blankets, <i>L.V. Boccaccini, L. Giancarli, G. Janeschitz,</i> <i>S. Hermsmeyer, Y. Poitevin, A. Cardella and</i> <i>E. Diegele</i>			148
Role and contribution of ITER in research of materials and reactor components, <i>V. Barabash</i>			156
Discussion on fast track and impact on materials R&D strategy – fusion material issues for the energy sys- tems in future, <i>S. Konishi</i>			161

Materials needs for fusion, Generation IV fission reactors and spallation neutron sources – similarities and differences, <i>L.K. Mansur, A.F. Rowcliffe, R.K. Nanstad, S.J. Zinkle, W.R. Corwin and R.E. Stoller</i>	166	<i>Carlan, M. Muruganath, T. Sourmail and H.K.D.H. Bhadeshia</i>	238
<b>Section 2. ITER and IFMIF</b>		Reduced activation martensitic steels as a structural material for ITER test blanket, <i>K. Shiba, M. Enoeda and S. Jitsukawa</i>	243
Overview of recent European materials R&D activities related to ITER, <i>A.T. Peacock, V. Barabash, W. Dänner, M. Rödiger, P. Lorenzetto, P. Marmy, M. Merola, B.N. Singh, S. Tähtinen, J. van der Laan and C.H. Wu</i>	173	Fatigue crack growth behavior of JLF-1 steel including TIG weldments, <i>S.W. Kim, H.K. Yoon, W.J. Park and A. Kohyama</i>	248
Overview on materials R&D activities in Japan towards ITER construction and operation, <i>H. Takatsu, K. Sato, K. Hamada, M. Nakahira, S. Suzuki, H. Nakajima, T. Kuroda, T. Nishitani, T. Shikama and W. Shu</i>	178	Cyclic instability of martensite laths in reduced activation ferritic/martensitic steels, <i>A.F. Armas, C. Petersen, R. Schmitt, M. Avalos and I. Alvarez</i>	252
Experimental evaluation of tritium permeation through stainless steel tubes of heat exchanger from primary to secondary water in ITER, <i>H. Nakamura and M. Nishi</i>	183	Materials design data for reduced activation martensitic steel type EUROFER, <i>A.-A.F. Tavassoli, A. Alamo, L. Bedel, L. Forest, J.-M. Gentzbittel, J.-W. Rensman, E. Diegele, R. Lindau, M. Schirra, R. Schmitt, H.C. Schneider, C. Petersen, A.-M. Lancha, P. Fernandez, G. Filacchioni, M.F. Maday, K. Mergia, N. Boukos, Baluc, P. Spätig, E. Alves and E. Lucon</i>	257
In-beam mechanical testing of CuCrZr, <i>P. Marmy</i>	188	Thermal fatigue behaviour of different candidate structural materials: a comparative study, <i>G. Filacchioni, E. Casagrande, U. De Angelis, G. De Santis, D. Ferrara and L. Pilloni</i>	263
IFMIF accelerator facility, <i>R.A. Jameson, R. Ferdinand, H. Klein, J. Rathke, J. Sredniawski and M. Sugimoto</i>	193	Study of irradiation effects in China low activation martensitic steel CLAM, <i>Q. Huang, J. Li and Y. Chen</i>	268
Low activation materials applicable to the IFMIF accelerator, <i>M. Sugimoto and H. Takeuchi</i>	198	Grain boundary microchemistry and metallurgical characterization of Eurofer'97 after simulated service conditions, <i>P. Fernández, M. García-Mazarío, A.M. Lancha and J. Lapeña</i>	273
Present status of the liquid lithium target facility in the international fusion materials irradiation facility (IFMIF), <i>H. Nakamura, B. Riccardi, N. Loginov, K. Ara, L. Burgazzi, S. Cevolani, G. Dell'Orco, C. Fazio, D. Giusti, H. Horiike, M. Ida, H. Ise, H. Kakui, H. Matsui, G. Micciche, T. Muroga, H. Nakamura, K. Shimizu, M. Sugimoto, A. Suzuki, H. Takeuchi, S. Tanaka and T. Yoneoka</i>	202	Tensile properties of a tempered martensitic iron–chromium–carbon model alloy, <i>R. Bonadé, P. Spätig, M. Victoria, T. Yamamoto and G.R. Odette</i>	278
High speed lithium flow experiments for IFMIF target, <i>H. Kondo, A. Fujisato, N. Yamaoka, S. Inoue, S. Miyamoto, F. Sato, T. Iida, H. Horiike, I. Matushita, M. Ida, H. Nakamura, H. Nakamura and T. Muroga</i>	208	Microstructure property analysis of HFIR-irradiated reduced-activation ferritic/martensitic steels, <i>H. Tanigawa, N. Hashimoto, H. Sakasegawa, R.L. Klueh, M.A. Sokolov, K. Shiba, S. Jitsukawa and A. Kohyama</i>	283
Assessment of the $^3\text{H}$ and $^7\text{Be}$ generation in the IFMIF lithium loop, <i>S.P. Simakov, U. Fischer and U. von Möllendorff</i>	213	SANS investigation of proton-irradiated EUROFER97, <i>P. Spätig, R. Schäublin, N. Baluc, J. Kohlbrecher and M. Victoria</i>	289
Experimental studies on the neutron emission spectrum and activation cross-section for 40 MeV deuterons in IFMIF accelerator structural elements, <i>M. Hagiwara, T. Itoga, M. Baba, M.S. Uddin, N. Hirabayashi, T. Oishi and T. Yamauchi</i>	218	Synergistic effect of helium and hydrogen for defect evolution under multi-ion irradiation of Fe–Cr ferritic alloys, <i>T. Tanaka, K. Oka, S. Ohnuki, S. Yamashita, T. Suda, S. Watanabe and E. Wakai</i>	294
Overview on the IFMIF test cell development, <i>V. Heinzl, P. Bem, E. Esposito, S. Gordeev, U. Fischer, A. Moeslang, S. Simakov, A. Shimizu, M. Sugimoto, I. Tiseanu, P. Vladimirov, Y. Watanabe and T. Yutani</i>	223	Creep rupture properties of nitrogen added 10Cr ferritic/martensitic steels, <i>S.H. Kim, B.J. Song, W.S. Ryu and J.H. Hong</i>	299
Transmutation behaviour of Eurofer under irradiation in the IFMIF test facility and fusion power reactors, <i>U. Fischer, S.P. Simakov and P.P.H. Wilson</i>	228	Microstructural examination of low activation ferritic steels following irradiation in ORR at 330 and 400 °C to ~10 dpa, <i>D.S. Gelles</i>	304
Comparison of material irradiation conditions for fusion, spallation, stripping and fission neutron sources, <i>P. Vladimirov and A. Moeslang</i>	233	Microstructure and mechanical properties of F82H weld metal irradiated in SINQ target-3, <i>X. Jia and Y. Dai</i>	309
<b>Section 3. Ferritic/martensitic and ODS steels</b>		Microstructure and mechanical properties of ferritic/martensitic steel EP-823 after neutron irradiation to high doses in BOR-60, <i>S.I. Porollo, A.M. Dvoriashin, Yu.V. Konobeev and F.A. Garner</i>	314
Design of new Fe–9CrWV reduced-activation martensitic steels for creep properties at 650 °C, <i>Y. de</i>		Influence of high dose neutron irradiation on microstructure of EP-450 ferritic–martensitic steel irradiated in three Russian fast reactors, <i>A.M. Dvoriashin, S.I. Porollo, Yu.V. Konobeev and F.A. Garner</i>	319

Effects of heat treatment process for blanket fabrication on mechanical properties of F82H, <i>T. Hirose, K. Shiba, T. Sawai, S. Jitsukawa and M. Akiba</i>	324	Radiochemical reprocessing of V–Cr–Ti alloy and its feasibility study, <i>S.A. Bartenev, I.B. Kvasnitskij, B.N. Kolbasov, P.V. Romanov and V.N. Romanovskij</i>	406
Creep deformation of iron strengthened by MX type particles, <i>M. Tamura, H. Sakasegawa, A. Kohyama, H. Esaka and K. Shinozuka</i>	328	Influence of heat treatment on hydrogen ingress into V–4Cr–4Ti alloy, <i>R. Hayakawa, Y. Hatano, K.-i. Fukumoto, H. Matsui and K. Watanabe</i>	411
Assessment of ODS-14%Cr ferritic alloy for high temperature applications, <i>A. Alamo, V. Lambard, X. Averty and M.H. Mathon</i>	333	Creep rupture properties of helium implanted V–4Cr–4Ti alloy NIFS-HEAT-2, <i>T. Chuto, N. Yamamoto, J. Nagakawa and Y. Murase</i>	416
Nanometer scale precipitation in ferritic MA/ODS alloy MA957, <i>M.K. Miller, D.T. Hoelzer, E.A. Kenik and K.F. Russell</i>	338	The precipitation behavior of ion irradiated V–4Cr–4Ti alloys at various oxygen and nitrogen levels, <i>M. Hatakeyama, H. Watanabe, T. Muroga and N. Yoshida</i>	420
Ring-tensile properties of irradiated oxide dispersion strengthened ferritic/martensitic steel claddings, <i>T. Yoshitake, Y. Abe, N. Akasaka, S. Ohtsuka, S. Ukai and A. Kimura</i>	342	The study of temperature variation during HFIR irradiation on vanadium, <i>H. Watanabe, T. Muroga and N. Yoshida</i>	425
TEM characterization of structure and composition of nanosized ODS particles in reduced activation ferritic–martensitic steels, <i>M. Klimiankou, R. Lindau and A. Möslang</i>	347	Effect of the modes of thermomechanical treatment on the formation of the multiphase and grain structure of V–4Ti–4Cr alloys, <i>A.N. Tyumentsev, A.D. Korotaev, Yu.P. Pinzhin, I.A. Ditenberg, S.V. Litovchenko, Ya.V. Shuba, N.V. Shevchenko, V.A. Drobishev, M.M. Potapenko and V.M. Chernov</i>	429
Irradiation creep and swelling from 400 to 600 °C of the oxide dispersion strengthened ferritic alloy MA957, <i>M.B. Toloczko, D.S. Gelles, F.A. Garner, R.J. Kurtz and K. Abe</i>	352	Potential energy diagram for hydrogen near vanadium surface, <i>I. Takagi, T. Sugihara, T. Sasaki, K. Moritani and H. Moriyama</i>	434
Tube manufacturing trials by different routes in 9CrW-ODS martensitic steels, <i>S. Ukai, T. Narita, A. Alamo and P. Parmentier</i>	356	Effect of precipitation and solution behavior of impurities on mechanical properties of low activation vanadium alloy, <i>A. Nishimura, A. Iwahori, N.J. Heo, T. Nagasaka, T. Muroga and S.-I. Tanaka</i>	438
Effect of particle morphology and microstructure on strength, work-hardening and ductility behaviour of ODS-(7–13)Cr steels, <i>D. Preininger</i>	362	Effects of purity on high temperature mechanical properties of vanadium alloys, <i>M. Koyama, K. Fukumoto and H. Matsui</i>	442
TEM examination of microstructural evolution during processing of 14CrYWTi nanostructured ferritic alloys, <i>H. Kishimoto, M.J. Alinger, G.R. Odette and T. Yamamoto</i>	369	Effect of neutron irradiation on the microstructure and hardness in particle dispersed ultra-fine grained V–Y alloys, <i>S. Kobayashi, Y. Tsuruoka, K. Nakai and H. Kurishita</i>	447
Improvement of 9Cr-ODS martensitic steel properties by controlling excess oxygen and titanium contents, <i>S. Ohtsuka, S. Ukai, M. Fujiwara, T. Kaito and T. Narita</i>	372	Influence of Cr, Ti concentrations on oxidation and corrosion resistance of V–Cr–Ti type alloys, <i>M. Fujiwara, K. Takanashi, M. Satou, A. Hasegawa, K. Abe, K. Kakiuchi and T. Furuya</i>	452
Nano-oxide particle stability of 9–12Cr grain morphology modified ODS steels under neutron irradiation, <i>S. Yamashita, N. Akasaka and S. Ohnuki</i>	377	Mechanical properties and microstructures of high-chromium V–Cr–Ti type alloys, <i>K. Sakai, M. Satou, M. Fujiwara, K. Takanashi, A. Hasegawa and K. Abe</i>	457
The development and stability of Y–Ti–O nanoclusters in mechanically alloyed Fe–Cr based ferritic alloys, <i>M.J. Alinger, G.R. Odette and D.T. Hoelzer</i>	382	High temperature strength of fine-grained, particle-dispersed V–(1.7–2.4)wt%Y alloys with different grain sizes and particle densities, <i>S. Oda, H. Kurishita, Y. Tsuruoka, S. Kobayashi, K. Nakai and H. Matsui</i>	462
Corrosion properties of oxide dispersion strengthened steels in super-critical water environment, <i>H.S. Cho, A. Kimura, S. Ukai and M. Fujiwara</i>	387	Dislocation channel formation process in V–Cr–Ti alloys irradiated below 300 °C, <i>M. Sugiyama, K. Fukumoto and H. Matsui</i>	467
Y <sub>2</sub> O <sub>3</sub> nano-particle formation in ODS ferritic steels by Y and O dual ion-implantation, <i>D. Sakuma, S. Yamashita, K. Oka, S. Ohnuki, L.E. Rehn and E. Wakai</i>	392	Varying temperature effects on mechanical properties of vanadium alloys during neutron irradiation, <i>K. Fukumoto, H. Matsui, T. Muroga, S.J. Zinkle, D.T. Hoelzer and L.L. Snead</i>	472
<b>Section 4. Vanadium alloys</b>		Dynamic and static hydrogen effects on mechanical properties in pure vanadium, <i>Y. Wang, M. Kane-dome, T. Yasuda, T. Suda, S. Watanabe, S. Ohnuki, T. Nagasaka and T. Muroga</i>	477
Deuterium retention in V–4Cr–4Ti alloy after deuterium ion irradiation, <i>Y. Yamauchi, T. Yamada, Y. Hirohata, T. Hino and T. Muroga</i>	397	Effect of alloying elements and neutron-irradiation on hydrogen behavior in V alloys, <i>S. Ohnuki, T. Yasuda, T. Suda, S. Watanabe and B.M. Oliver</i>	481
The development of advanced vanadium alloys for fusion applications, <i>J.M. Chen, T. Muroga, S.Y. Qiu, T. Nagasaka, W.G. Huang, M.J. Tu, Y. Chen, Y. Xu and Z.Y. Xu</i>	401		

## Section 5. SiC/SiC composites

Effect of helium on dislocation loop formation and radiation swelling in SiC, <i>A.I. Ryazanov, A.V. Klaptsov, A. Kohyama, Y. Katoh and H. Kishimoto</i>	486
Development of new interface potential for evaluating strength of SiC/SiC composite joint, <i>H. Serizawa, C.A. Lewinsohn and H. Murakawa</i>	492
Thermal diffusivity/conductivity of Tyranno SA fiber- and Hi-Nicalon Type S fiber-reinforced 3-D SiC/SiC composites, <i>R. Yamada, N. Igawa and T. Taguchi</i>	497
A model stress analysis of swelling in SiC/SiC composites as a function of fiber type and carbon interphase structure, <i>C.H. Henager Jr., E.A. Le and R.H. Jones</i>	502
Effects of irradiation and post-irradiation annealing on the thermal conductivity/diffusivity of monolithic SiC and f-SiC/SiC composites, <i>G.E. Youngblood, D.J. Senor and R.H. Jones</i>	507
The investigation of crack mechanism for Tyranno-SA SiC/SiC composites with ESI method, <i>J.Y. Yan, C.W. Chen, P.C. Fang, K.M. Yin, F.R. Chen, Y. Katoh, A. Kohyama and J.J. Kai</i>	513
Study of helium bubble formation in SiCf/PyC/ $\beta$ -SiC composites by dual-beam irradiation, <i>T.S. Duh, K.M. Yin, J.Y. Yan, P.C. Fang, C.W. Chen, J.J. Kai, F.R. Chen, Y. Katoh and A. Kohyama</i>	518
Limits on irradiation-induced thermal conductivity and electrical resistivity in silicon carbide materials, <i>L.L. Snead</i>	524
Densification of SiC <sub>f</sub> /SiC composite by the multi-step of whisker growing and matrix filling, <i>S.M. Kang, J.Y. Park, W.-J. Kim, S.G. Yoon and W.S. Ryu</i>	530
High temperature characterization of reaction sintered SiC based materials, <i>S.P. Lee, J.O. Jin, J.S. Park, A. Kohyama, Y. Katoh, H.K. Yoon, D.S. Bae and I.S. Kim</i>	534
Tyranno-SA/SiC composite with SiC nanowires in the matrix by CVI process, <i>W. Yang, H. Araki, A. Kohyama, Y. Katoh, Q. Hu, H. Suzuki and T. Noda</i>	539
Neutron irradiation effects on high-crystallinity and near-stoichiometry SiC fibers and their composites, <i>T. Nozawa, T. Hinoki, L.L. Snead, Y. Katoh and A. Kohyama</i>	544
Damage evaluation of W-coated SiC by thermal conductivity measurement, <i>Y. Lee, S.J. Son, Y. Katoh and A. Kohyama</i>	549
Preparation of silicon-based oxide layer on high-crystalline SiC fiber as an interphase in SiC/SiC composites, <i>N. Igawa, T. Taguchi, R. Yamada, Y. Ishii and S. Jitsukawa</i>	554
Tailoring the microstructure of hot-pressed SiC by heat treatment, <i>J.S. Park, Y. Katoh, A. Kohyama, J.K. Lee, J.J. Sha and H.K. Yoon</i>	558
Issues of low activation brazing of SiC <sub>f</sub> /SiC composites by using alloys without free silicon, <i>B. Riccardi, C.A. Nannetti, T. Petrisor, J. Woltersdorf, E. Pippel, S. Libera and L. Piloni</i>	562
Fabrication and flexural properties of Tyranno-SA/SiC composites with carbon interlayer by CVI, <i>H. Araki, W. Yang, H. Suzuki, Q. Hu, C. Busabok and T. Noda</i>	567

Fabrication of advanced SiC fiber/F-CVI SiC matrix composites with SiC/C multi-layer interphase, <i>T. Taguchi, T. Nozawa, N. Igawa, Y. Katoh, S. Jitsukawa, A. Kohyama, T. Hinoki and L.L. Snead</i>	572
Effect of He pre-implantation and neutron irradiation on mechanical properties of SiC/SiC composite, <i>S. Nogami, A. Hasegawa, L.L. Snead, R.H. Jones and K. Abe</i>	577
Study of hydrogen effects on microstructural development of SiC base materials under simultaneous irradiation with He- and Si-ion irradiation conditions, <i>A. Hasegawa, S. Miwa, S. Nogami, A. Taniguchi, T. Taguchi and K. Abe</i>	582
SiC/SiC composites through transient eutectic-phase route for fusion applications, <i>Y. Katoh, A. Kohyama, T. Nozawa and M. Sato</i>	587
Effect of heat treatment on the tensile strength and creep resistance of advanced SiC fibers, <i>J.J. Sha, T. Nozawa, J.S. Park, Y. Katoh and A. Kohyama</i>	592

## Section 6. Austenitic steels and related technologies

Calculation of radiation-induced deformation of SUS 316 in the ITER-relevant condition, <i>J. Nagakawa and K. Ueno</i>	597
Effect of cold work on the irradiation creep of SUS 316L, <i>K. Ueno, J. Nagakawa, Y. Murase and N. Yamamoto</i>	602
Embrittlement of ER309L stainless steel clad by $\sigma$ -phase and neutron irradiation, <i>I.S. Kim, J.S. Lee and A. Kimura</i>	607
Experimental investigation of stress effect on swelling and microstructure of Fe-16Cr-15Ni-3Mo-Nb austenitic stainless steel under low-temperature irradiation up to high damage dose in the BOR-60 reactor, <i>V.S. Neustroev, Z.E. Ostrovsky and V.K. Shamardin</i>	612
Influence of radiation-induced voids and bubbles on physical properties of austenitic structural alloys, <i>I.I. Balachov, E.N. Shcherbakov, A.V. Kozlov, I.A. Portmykh and F.A. Garner</i>	617
The strong influence of displacement rate on void swelling in variants of Fe-16Cr-15Ni-3Mo austenitic stainless steel irradiated in BN-350 and BOR-60, <i>N.I. Budylnkin, T.M. Bulanova, E.G. Mironova, N.M. Mitrofanova, S.I. Porollo, V.M. Chernov, V.K. Shamardin and F.A. Garner</i>	621
Characterization of 08Cr16Ni11Mo3 stainless steel irradiated in the BN-350 reactor, <i>O.P. Maksimkin, K.V. Tsai, L.G. Turubarova, T. Doronina and F.A. Garner</i>	625
Swelling and post-irradiated deformation structures in 18Cr-10Ni-Ti irradiated with heavy ions, <i>O.V. Borodin, V.V. Bryk, A.S. Kalchenko, I.M. Neklyudov, A.A. Parkhomenko and V.N. Voyevodin</i>	630
Mechanical tests on the welding part of SS316LN after heat treatment for Nb <sub>3</sub> Sn superconducting conductor, <i>Y. Kudo, A. Sakasai, K. Hamada, K. Takano, H. Nakajima, K. Okuno, M. Matsukawa, H. Tamai and S. Ishida</i>	634

Effect of irradiation on the steels 316L/LN type to 12 dpa at 400 °C, <i>T. Bulanova, A. Fedoseev, G. Kalinin, B. Rodchenkov and V. Shamardin</i>	639	of inside vacuum vessel wall on JFT-2M, <i>K. Tsuzuki, K. Shinohara, K. Kamiya, H. Kawashima, M. Sato, G. Kurita, M. Bakhtiari, H. Ogawa, K. Hoshino, S. Kasai, K. Uehara, Y. Kusama, M. Yamamoto, T. Shibata, K. Kikuchi, H. Tsutsui, R. Shimada, T. Hino, Y. Hirohata, A. Amemiya, Y. Sadamoto, Y. Nagashima and A. Ejiri</i>	721
Effects of silicon, carbon and molybdenum additions on IASCC of neutron irradiated austenitic stainless steels, <i>J. Nakano, Y. Miwa, T. Kohya and T. Tsukada</i>	643	Laser inertial fusion dry-wall materials response to pulsed ions at power-plant level fluences, <i>T.J. Renk, T.J. Tanaka, C.L. Olson, R.R. Peterson and T.R. Knowles</i>	726
Effect of pre-strain and reheating on isothermal $\alpha'$ martensite formation in Fe-25.5Ni-4Cr austenitic steel, <i>Y. Nihei, Y. Hiraoka, Y. Kagaya, Y. Kohno, K. Shibata and H. Ohtsuka</i>	648	Modeling of erosion and deposition patterns on C-W and W-Ta twin limiters exposed to the TEXTOR edge plasmas, <i>K. Ohya, T. Tanabe, M. Rubel, M. Wada, T. Ohgo, T. Hirai, V. Philipps, A. Kirschner, A. Pospieszczyk, A. Huber, G. Sergienko, S. Brezinsk and N. Noda</i>	732
Study on irradiation induced corrosion behavior in austenitic stainless steel using hydrogen-ion bombardment, <i>K. Kondou, A. Hasegawa and K. Abe</i>	652	Simulation study of dynamical material mixing on tungsten surfaces at elevated temperatures due to hydrogen and carbon mixed ion beam irradiation, <i>R. Kawakami, T. Shimada, Y. Ueda and M. Nishikawa</i>	737
Effects of water and irradiation temperatures on IASCC susceptibility of type 316 stainless steel, <i>T. Tsukada, Y. Miwa, S. Jitsukawa, K. Shiba and A. Ouchi</i>	657	Microscopic damage of materials exposed to glow discharge cleanings in LHD, <i>M. Miyamoto, M. Tokitani, K. Tokunaga, T. Fujiwara, N. Yoshida, S. Masuzaki and A. Komori</i>	742
Re-weldability of neutron irradiated Type 304 and 316L stainless steels, <i>Y. Morishima, M. Koshiishi, K. Kashiwakura, T. Hashimoto and S. Kawano</i>	663	Carbon behavior on tungsten surface after carbon and hydrogen mixed beam irradiation, <i>T. Shimada, T. Funabiki, R. Kawakami, Y. Ueda and M. Nishikawa</i>	747
Post-irradiation annealing effect on helium diffusivity in austenitic stainless steels, <i>R. Katsura, J. Morisawa, S. Kawano and B.M. Oliver</i>	668	Effects of heat treatment on trapping and release of tritium from He pre-irradiated tungsten, <i>M. Matsuyama, S. Nakagawa, M. Enyama, K. Watanabe, H. Iwakiri and N. Yoshida</i>	752
<b>Section 7. High Z plasma facing and high heat flux materials</b>		Synergistic effects of high heat loading and helium irradiation of tungsten, <i>K. Tokunaga, S. Tamura, N. Yoshida, K. Ezato, M. Taniguchi, K. Sato, S. Suzuki and M. Akiba</i>	757
Plasma material interaction studies on low activation materials used for plasma facing or blanket component, <i>T. Hino, Y. Hirohata, Y. Yamauchi, M. Hashiba, A. Kohyama, Y. Katoh, Y. Lee, T. Jinushi, M. Akiba, K. Nakamura, H. Yoshida, S. Sengoku, K. Tsuzuki, Y. Kusama, K. Yamaguchi and T. Muroga</i>	673	Desorption of helium from austenitic stainless steel heavily bombarded by low energy He ions, <i>M. Tokitani, M. Miyamoto, K. Tokunaga, H. Iwakiri, T. Fujiwara and N. Yoshida</i>	761
Impurity release and deuterium retention properties of a ferritic steel wall in JFT-2M, <i>H. Ogawa, Y. Yamauchi, K. Tsuzuki, H. Kawashima, M. Sato, K. Shinohara, K. Kamiya, S. Kasai, Y. Kusama, K. Yamaguchi, Y. Hirohata, M. Hashiba and T. Hino</i>	678	Post irradiation testing of samples from the irradiation experiments PARIDE 3 and PARIDE 4, <i>M. Roedig, W. Kuehnlein, J. Linke, D. Pitzer, M. Merola, E. Rigal, B. Schedler and E. Visca</i>	766
Neutronics benchmark experiment on tungsten, <i>P. Battistoni, M. Angelone, L. Petrizzi and M. Pillon</i>	683	Effects of carbon impurity in fusion plasmas on erosion of RAF first wall, <i>Y. Ueda, T. Funabiki, T. Shimada, R. Kawakami and M. Nishikawa</i>	771
High heat flux properties of pure tungsten and plasma sprayed tungsten coatings, <i>X. Liu, S. Tamura, K. Tokunaga, N. Yoshida, N. Noda, L. Yang and Z. Xu</i>	687	Current status of ductile tungsten alloy development by mechanical alloying, <i>Y. Ishijima, H. Kurishita, K. Yubuta, H. Arakawa, M. Hasegawa, Y. Hiraoka, T. Takida and K. Takebe</i>	775
Thermal desorption and surface modification of He <sup>+</sup> implanted into tungsten, <i>Z. Fu, N. Yoshida, H. Iwakiri and Z. Xu</i>	692	Effect of tungsten microstructure on blister formation by hydrogen and carbon mixed ion beam irradiation, <i>T. Funabiki, T. Shimada, Y. Ueda and M. Nishikawa</i>	780
Estimation of carbon fibre composites as ITER divertor armour, <i>S. Pestchanyi, V. Safronov and I. Landman</i>	697		
Structural analysis of a plasma facing component reinforced with fibrous metal matrix composite laminate, <i>J.H. You and H. Bolt</i>	702	<b>Section 8. Low Z plasma facing and high flux materials</b>	
Formation of dust particles under the influence of intense thermal loads, <i>Y. Koza, E. Berthe, E. Lehmann, J. Linke, M. Rödíg, E. Wessel and L. Singheiser</i>	706	Depth profile and retention of hydrogen isotopes in graphite tiles used in the W-shaped divertor of JT-60U, <i>Y. Hirohata, Y. Oya, H. Yoshida,</i>	
High-temperature properties of joint interface of VPS-tungsten coated CFC, <i>S. Tamura, X. Liu, K. Tokunaga, Y. Tsunekawa, M. Okumiya, N. Noda and N. Yoshida</i>	711		
Cross-section sensitivity analyses of 14 MeV Neutron Benchmark Experiment on Tungsten, <i>I. Kodeli</i>	717		
Investigation of compatibility of low activation ferritic steel with high performance plasma by full covering			

<i>Y. Morimoto, T. Arai, K. Kizu, J. Yagyu, K. Masaki, Y. Gotoh, K. Okuno, N. Miya, T. Hino, S. Tanaka and T. Tanabe</i>	785	<i>G. Matern, M. Mayer, R. Neu, H. Renner, J. Roth, M. Riegert-Escribano, J. Simon-Weidner and R. Wacker</i>	849
Deuterium retention in carbon dust and carbon-tungsten mixed dust prepared by deuterium arc discharge, <i>H. Yoshida, M. Taniguchi, K. Yokoyama, Y. Yamauchi, Y. Hirohata, M. Akiba and T. Hino</i>	790	Modeling of beryllium sputtering and re-deposition in fusion reactor plasma facing components, <i>A.M. Zimin, L.S. Danelyan, N.G. Elistratov, V.M. Gureev, M.I. Guseva, B.N. Kolbasov, V.S. Kulikauskas, V.G. Stolyarova, N.N. Vasiliev and V.V. Zatekin</i>	855
Overview of tracer techniques in studies of material erosion, re-deposition and fuel inventory in tokamaks, <i>M.J. Rubel, J.P. Coad, K. Stenström, P. Wienhold, J. Likonen, G.F. Matthews and V. Philipps</i>	795	Modified formula for the assessment of the thermal response of neutron irradiated CFC, <i>V. Barabash and L.L. Snead</i>	860
Material probe study for plasma facing wall of LHD, <i>Y. Nobuta, Y. Yamauchi, Y. Hirohata, T. Hino, A. Sagara, S. Masuzaki, N. Ashikawa, N. Noda, O. Motojima and LHD Experimental Group</i>	800	Room temperature creep-fatigue response of selected copper alloys for high heat flux applications, <i>M. Li, B.N. Singh and J.F. Stubbins</i>	865
SiC-fibre reinforced copper as heat sink material for fusion applications, <i>A. Brendel, C. Popescu, C. Leyens, J. Woltersdorf, E. Pippel and H. Bolt</i>	804	Implanted hydrogen isotope retention and chemical behavior in boron thin films for wall conditioning, <i>Y. Oya, H. Kodama, M. Oyaidzu, Y. Morimoto, M. Matsuyama, A. Sagara, N. Noda and K. Okuno</i>	870
The effect of helium generation and irradiation temperature on tritium release from neutron irradiated beryllium, <i>I.B. Kupriyanov, V.A. Gorokhov, V.V. Vlasov, A.M. Kovalev and V.P. Chakin</i>	809	Tritium profile in plasma-facing components following D-D operation, <i>K. Sugiyama, T. Tanabe, K. Miyasaka, K. Masaki, K. Tobita, N. Miya, V. Philipps, M. Rubel, C.H. Skinner, C.A. Gentile, T. Saze and K. Nishizawa</i>	874
Assessment of the heating technique as a possible ex situ detritiation method for carbon wall materials from fusion machines, <i>N. Bekris, C.H. Skinner, U. Berndt, C.A. Gentile, M. Glugla, A. Erbe and W. Pilz</i>	814	Thermal desorption of deuterium from ion irradiated Be <sub>12</sub> Ti, <i>H. Iwakiri, K. Yasunaga, N. Yoshida, M. Uchida and H. Kawamura</i>	880
Thermal fatigue experiment of screw cooling tube under one-sided heating condition, <i>K. Ezato, S. Suzuki, K. Sato and M. Akiba</i>	820	Heat load test of beryllium and CuCrZr joints, <i>H. Yamada, M. Uchida, M. Uda, T. Iwadachi, M. Nakamichi and H. Kawamura</i>	885
Study of hydrogen isotope interaction with beryllium and carbon surfaces under their simultaneous exposure to stationary and powerful pulsed plasma, <i>M.I. Guseva, V.M. Gureev, L.S. Danelyan, B.N. Kolbasov, S.N. Korshunov, I.D. Skorlupkin, V.G. Stolyarova, V.I. Vasil'ev, V.M. Strunnikov, V.V. Zatyokin and V.S. Kulikauskas</i>	825	Studies on structural and chemical characterization for boron coating films deposited by PCVD, <i>H. Kodama, M. Oyaidzu, M. Sasaki, H. Kimura, Y. Morimoto, Y. Oya, M. Matsuyama, A. Sagara, N. Noda and K. Okuno</i>	889
Simulation study of sputtering erosion and impurity deposition on carbon and tungsten surfaces irradiated with deuterium plasmas including carbon impurity, <i>T. Mitani, R. Kawakami and S. Kuriu</i>	830	Correlation between hydrogen isotope profiles and surface structure of divertor tiles in JT-60U, <i>Y. Morimoto, Y. Oya, Y. Hirohata, H. Kodama, H. Yoshida, K. Kizu, J. Yagyu, K. Masaki, Y. Gotoh, N. Miya, K. Okuno and T. Tanabe</i>	894
Measurement of deuterium and tritium retentions on the surface of JT-60 divertor tiles by means of nuclear reaction analysis, <i>K. Ochiai, T. Hayashi, C. Kutsukake, Y. Gotoh, K. Masaki, T. Arai, N. Miya and T. Nishitani</i>	836	Energetic deuterium and helium irradiation effects on chemical structure of CVD diamond, <i>M. Sasaki, Y. Morimoto, H. Kimura, K. Takahashi, K. Sakamoto, T. Imai and K. Okuno</i>	899
Transmission electron microscopy of redeposition layers on graphite tiles used for open divertor armor of JT-60, <i>Y. Gotoh, T. Arai, J. Yagyu, K. Masaki, K. Kodama and N. Miya</i>	840	Behavior of tritium release from thin boron films deposited on SS316, <i>S. Nakagawa, M. Matsuyama, H. Kodama, Y. Oya, K. Okuno, A. Sagara, N. Noda and K. Watanabe</i>	904
In-out asymmetry of low-Z impurity deposition on the JT-60U divertor tiles, <i>K. Masaki, J. Yagyu, Y. Miyo, Y. Gotoh, T. Arai, T. Hayashi, K. Kodama, T. Sasajima, A. Kaminaga, T. Tanabe and N. Miya</i>	845	High heat flux components in fusion devices: from current experience in Tore Supra towards the ITER challenge, <i>A. Grosman, P. Bayetti, P. Chappuis, J.J. Cordier, A. Durocher, F. Escourbiac, D. Guilhem, M. Lipa, G. Marbach, R. Mitteau and J. Schlosser</i>	909
Evaluation of vacuum plasma-sprayed boron carbide protection for the stainless steel first wall of WENDELSTEIN 7-X, <i>H. Greuner, M. Balden, B. Boeswirth, H. Bolt, R. Gadow, P. Grigull, G. Hofmann, T. Huber, W. Kasparek, H. Kunric, S. Lindig,</i>		Rupture analysis of CuCrZr plasma facing component during a loss of flow accident in Tore-Supra, <i>A. Durocher, M. Lipa, Ph. Chappuis, G. Martin and J.J. Cordier</i>	914
		Author index Parts A and B . . . . .	xxv
		Subject index Parts A and B . . . . .	liii

**Part B****Section 9. Defect production (Kiritani memorial session)**

- Dynamic observation of the collapse process of a stacking fault tetrahedron by moving dislocations, *Y. Matsukawa and S.J. Zinkle* 919
- The effects of interfaces on radiation damage production in layered metal composites, *H.L. Heinisch, F. Gao and R.J. Kurtz* 924
- Anisotropic motion of point defects near edge dislocations, *K. Sato, T. Yoshiie, T. Ishizaki and Q. Xu* 929
- Release of helium from irradiation damage in Fe-9Cr ferritic alloy, *K. Ono, K. Arakawa, H. Shibasaki, H. Kurata, I. Nakamichi and N. Yoshida* 933
- Effect of initial oxygen content on the void swelling behavior of fast neutron irradiated copper, *S.J. Zinkle and F.A. Garner* 938
- Microstructural evolution in Fe and Fe-Cr model alloys after He<sup>+</sup> ion irradiations, *R. Sugano, K. Morishita, A. Kimura, H. Iwakiri and N. Yoshida* 942
- Deformation microstructure of neutron-irradiated pure polycrystalline metals, *N. Hashimoto, T.S. Byun, K. Farrell and S.J. Zinkle* 947
- Impact of irradiation on the microstructure of nanocrystalline materials, *N. Nita, R. Schaeublin and M. Victoria* 953
- Microstructural change in AlMg<sub>3</sub> alloy irradiated by spallation neutrons and high energy protons, *D. Hamaguchi and Y. Dai* 958
- Vacancy-type defect production in iron under ion beam irradiation investigated with positron beam Doppler broadening technique, *T. Iwai, Y. Ito and M. Koshimizu* 963
- Detection of interstitial clusters in neutron irradiated Ni-Hf alloy by perturbed angular correlation and positron annihilation lifetime measurements, *H. Okazawa, T. Yoshiie, T. Ishizai, K. Sato, Q. Xu, Y. Satoh, Y. Ohkubo and Y. Kawase* 967
- Suppression of interstitial cluster diffusion by oversized solute atoms, *T.S. Hudson, S.L. Dudarev and A.P. Sutton* 971
- Deuterium retention and release from highly irradiated annealed tungsten after exposure to a deuterium DC glow discharge, *B.M. Oliver, R.A. Causey and S.A. Maloy* 977
- Study of damage processes of silica by in situ hydrogen-ion-induced luminescence measurements, *T. Yoshida, T. Tanabe, M. Watanabe, S. Takahara and S. Mizukami* 982
- Electron spin resonance measurement of irradiation defects in vitreous silica irradiated with neutrons and ion beams, *K. Moritani, Y. Teraoka, I. Takagi and H. Moriyama* 988
- Section 10. Radiation damage structures**
- Correlation between embrittlement and bubble microstructure in helium-implanted materials, *N. Yamamoto, T. Chuto, Y. Murase and J. Nagakawa* 993

- Plastic instability behavior of bcc and hcp metals after low temperature neutron irradiation, *T.S. Byun, K. Farrell and N. Hashimoto* 998
- Helium effects on EUROFER97 martensitic steel irradiated by dual-beam from 1 to 50 dpa at 250 and 300 °C with 10 He appm/dpa, *G. Yu, X. Li, J. Yu, Y. Wu, H. Kinoshita, H. Takahashi and M. Victoria* 1003
- Synergistic influence of displacement rate and helium/dpa ratio on swelling of Fe-(9, 12)Cr binary alloys in FFTF at ~400 °C, *F.A. Garner, D.S. Gelles, L.R. Greenwood, T. Okita, N. Sekimura and W.G. Wolfer* 1008
- Influence of boron on void swelling in model austenitic steels, *T. Okita, W.G. Wolfer, F.A. Garner and N. Sekimura* 1013
- Control of phosphorus inter-granular segregation in ferritic steels, *Z. Lu, R.G. Faulkner, N. Sakaguchi, H. Kinoshita, H. Takahashi and P.E.J. Flewitt* 1017
- Relationship between dimensional changes and the thermal conductivity of neutron-irradiated SiC, *T. Maruyama and M. Harayama* 1022
- Formation mechanism of bubbles and holes on tungsten surface with low-energy and high-flux helium plasma irradiation in NAGDIS-II, *D. Nishijima, M.Y. Ye, N. Ohno and S. Takamura* 1029
- Impedance measurements of thin film ceramics under ion beam irradiation, *F. Sato, T. Tanaka, T. Kagawa and T. Iida* 1034
- Effect of electron-beam irradiation temperature on irradiation damage of high Mn-Cr steel, *D.S. Bae, S.H. Nahm, H.M. Lee, H. Kinoshita, T. Shibayama and H. Takahashi* 1038
- Modeling of neutron irradiation response for B2-type ordered alloys, *T. Hoshiya, S. Takaya, T. Nakagiri and K. Aoto* 1043
- Electronic excitation effects on radiation damage in insulators under ion irradiation, *N. Kishimoto, N. Okubo, O.A. Plaksin and Y. Takeda* 1048
- Microstructural changes of neutron irradiated ODS ferritic and martensitic steels, *N. Akasaka, S. Yamashita, T. Yoshitake, S. Ukai and A. Kimura* 1053
- Helium bubble evolution in F82H-mod – correlation between SANS and TEM, *R. Coppola, M. Klimankou, M. Magnani, A. Möslang and M. Valli* 1057
- Neutron degradation of UV enhanced optical fibers for fusion installation plasma diagnostics, *D. Sporea, I. Vata, D. Dudu and A. Danis* 1062
- Section 11. Radiation effects on mechanical properties**
- In-beam fatigue behavior of F82H steel at 500 °C, *Y. Murase, J. Nagakawa, K. Chuto and N. Yamamoto* 1066
- Evolution of cleared channels in neutron-irradiated pure copper as a function of tensile strain, *D.J. Edwards and B.N. Singh* 1072
- Mechanical properties of the European reference RAFM steel (EUROFER97) before and after irradiation at 300 °C, *E. Lucon, R. Chaouadi and M. Decrétion* 1078
- Radiation effects on the mechanical integrity of novel organic insulators for the ITER magnet coils, *K.*

Bittner-Rohrhofer, K. Humer, H. Fillunger, R.K. Maix, H.W. Weber, P.E. Fabian and N.A. Munshi	1083	Development of an EAM potential for simulation of radiation damage in Fe–Cr alloys, J. Wallenius, I.A. Abrikosov, R. Chakarova, C. Lagerstedt, L. Malerba, P. Olsson, V. Pontikis, N. Sandberg and D. Terentyev	1175
Modeling tensile response and flow localization effects in selected copper alloys, X. Pan, X. Wu, M. Li and J.F. Stubbins	1088	Multiscale modeling of the brittle to ductile transition, S.J. Noronha, J. Huang and N.M. Ghoniem	1180
Bend-fatigue properties of 590 MeV proton irradiated JPCA and 316F SS, S. Saito, K. Kikuchi, K. Usami, A. Ishikawa, Y. Nishino, M. Kawai and Y. Dai	1093	Cascade and subcascade structure in fission neutron irradiated fcc metals and their correlation to fusion neutron irradiation, Y. Sato, M. Tsukada, H. Matsui and T. Yoshiie	1185
Fatigue properties of F82H irradiated at 523 K to 3.8 dpa, Y. Miwa, S. Jitsukawa and M. Yonekawa	1098	Atomistic simulations of threshold displacement energies in SiO <sub>2</sub> , F. Mota, M.-J. Caturla, J.M. Perlado, E. Dominguez and A. Kubota	1190
Orientation dependent elastic interaction between a truncated stacking fault tetrahedron and a glissile dislocation, M. Hiratani, V.V. Bulatov and H.M. Zbib	1103	Effects of chromium on the one-dimensional motion of interstitial-type dislocation loops in iron, K. Arakawa, M. Hatanaka, H. Mori and K. Ono	1194
Specimen size effects on ductile–brittle transition temperature in Charpy impact testing, H. Kurishita, T. Yamamoto, M. Narui, H. Suwarno, T. Yoshitake, Y. Yano, M. Yamazaki and H. Matsui	1107	The effects of grain boundary structure on binding of He in Fe, R.J. Kurtz and H.L. Heinisch	1199
Irradiation resistance of Eurofer97 at 300 °C up to 10 dpa, J. Rensman, E. Lucon, J. Boskeljon, J. van Hoepen, R. den Boef and P. ten Pierick	1113	Diffusion and conversion of interstitial dumbbells in segregated ternary alloys under irradiation, O. Shelyev, N. Sekimura and H. Abe	1204
Specimen size effects on fracture toughness of JLF-1 reduced-activation ferritic steel, H. Ono, R. Kasada and A. Kimura	1117	Elementary processes in channeling deformation in FCC copper: a molecular dynamics study, Y. Yang, N. Sekimura and H. Abe	1208
Effects of hydrogen on the mechanical properties of oxide dispersion strengthening steels, J.S. Lee, A. Kimura, S. Ukai and M. Fujiwara	1122	Modeling of radiation-induced segregation at grain boundaries in Fe–Cr–Ni alloys, I.A. Stepanov, V.A. Pechenkin and Yu.V. Konobeev	1214
Tensile properties of irradiated Cu single crystals and their temperature dependence, Z. Yao, R. Schäublin and M. Victoria	1127	Defect energetics of $\beta$ -SiC using a new tight-binding molecular dynamics model, M. Salvador, J.M. Perlado, A. Mattoni, F. Bernardini and L. Colombo	1219
Effect of tempering temperature and time on tensile properties of F82H irradiated by neutrons, E. Wakai, T. Taguchi, T. Yamamoto and F. Takada	1133	Computer simulation of the dynamical and thermally activated motion of interstitial clusters in Fe, E. Kuramoto, K. Ohsawa, J. Imai, K. Obata and T. Tsutsumi	1223
Synergistic effect of displacement damage and helium atoms on radiation hardening in F82H at TIARA facility, M. Ando, E. Wakai, T. Sawai, H. Tanigawa, K. Furuya, S. Jitsukawa, H. Takeuchi, K. Oka, S. Ohnuki and A. Kohyama	1137	Dislocation–stacking fault tetrahedron interaction: what can we learn from atomic-scale modelling, Yu.N. Osetsky, R.E. Stoller and Y. Matsukawa	1228
Mechanical characterization of austenitic stainless steel ion irradiated under external stress, I. Ioka, M. Futakawa, A. Naito, Y. Nanjo, K. Kiuchi and T. Naoe	1142	Hardening due to copper precipitates in $\alpha$ -iron studied by atomic-scale modelling, D.J. Bacon and Yu.N. Osetsky	1233
<b>Section 12. Theory and modeling of radiation effects</b>		Secondary factors influencing cascade damage formation, R.E. Stoller and S.G. Guiriec	1238
Impact of transmutation issues on interpretation of data obtained from fast reactor irradiation experiments, L.R. Greenwood and F.A. Garner	1147	A master curve analysis of F82H using statistical and constraint loss size adjustments of small specimen data, G.R. Odette, T. Yamamoto, H. Kishimoto, M. Sokolov, P. Spätig, W.J. Yang, J.-W. Rensman and G.E. Lucas	1243
‘Quantum core’ interatomic potentials for transition metals, S.L. Dudarev	1151	<b>Section 13. Breeding blanket materials</b>	
Molecular dynamics simulation of displacement cascades in Fe–Cr alloys, L. Malerba, D. Terentyev, P. Olsson, R. Chakarova and J. Wallenius	1156	In situ tritium recovery behavior from Li <sub>2</sub> TiO <sub>3</sub> pebble bed under neutron pulse operation, K. Tsuchiya, A. Kikukawa, T. Hoshino, M. Nakamichi, H. Yamada, D. Yamaki, M. Enoda, E. Ishitsuka, H. Kawamura, H. Ito and K. Hayashi	1248
Diffusivity of solute atoms, matrix atoms and interstitial atoms in Fe–Cr alloys: a molecular dynamics study, D. Terentyev and L. Malerba	1161	Tritium release kinetics from Li <sub>2</sub> TiO <sub>3</sub> pebbles as prepared by soft-wet-chemistry, S. Casadio, J.G. van der Laan, C. Alvani, A.J. Magielsen and M.P. Stijkel	1252
A multi-scale approach to radiation-induced segregation at various grain boundaries, N. Sakaguchi, S. Watanabe, H. Takahashi and R.G. Faulkner	1166	Observation of multiple O–D vibration peaks in Li <sub>2</sub> O using FT-IR, T. Oda, Y. Oya and S. Tanaka	1256
Helium release and diffusion mechanism in SiC containing B <sub>4</sub> C, Y. Pramono and T. Yano	1170		



Post-irradiation examinations of $\text{Li}_4\text{SiO}_4$ pebbles irradiated in the EXOTIC-8 experiment, <i>G. Piazza, A. Erbe, R. Rolli and O. Romer</i>	1260	Elemental development of beryllide electrode for pebble production by rotating electrode method, <i>M. Uchida, M. Uda, T. Iwadachi, M. Nakamichi and H. Kawamura</i>	1342
Tritium release from neutron-irradiated $\text{Li}_2\text{O}$ sintered pellets: isothermal annealing of tritium traps, <i>T. Tanifuji, D. Yamaki and S. Jitsukawa</i>	1266	State of beryllium after irradiation at low temperature up to extremely high neutron doses, <i>V.P. Chakin, I.B. Kupryanov and R.R. Melder</i>	1347
Hydrogen isotope behavior in $\text{Li}_2\text{O}$ at low temperature by FT-IR, <i>S. Tanaka, T. Oda and Y. Oya</i>	1270	Methods for the mitigation of the chemical reactivity of beryllium in steam, <i>F. Druyts, E.C. Alves and C.H. Wu</i>	1353
Modeling of HT and HTO release from irradiated lithium metazirconate, <i>S. Beloglazov, M. Nishikawa, M. Glugla and T. Kinjo</i>	1274	Stability of titanium beryllide under water vapor, <i>K. Munakata, H. Kawamura and M. Uchida</i>	1357
Observation of the microstructural changes in lithium titanate by multi-ion irradiation, <i>D. Yamaki, T. Nakazawa, T. Tanifuji, T. Aruga, S. Jitsukawa and K. Hojou</i>	1279	Purification of hydrogen isotopes using palladium molecular sieve, <i>L. Wenhua, S. Cansheng and L. Xuejian</i>	1361
Research on the preparation, electrical and mechanical properties of $\gamma\text{-LiAlO}_2$ ceramics, <i>Z. Wen, Z. Gu, X. Xu and X. Zhu</i>	1283	Experimental study of cracking methane by Ni/SiO <sub>2</sub> catalyst, <i>S. Fukada, N. Nakamura, J. Monden and M. Nishikawa</i>	1365
Tritium localisation and release from the ceramic pebbles of breeder, <i>G. Kizane, J. Tiliks, A. Vitiš and J. Rudzitis</i>	1287	Enhancement of isotope exchange reactions over ceramic breeder material by deposition of catalyst metal, <i>Y. Narisato, K. Munakata, A. Koga, Y. Yokoyama, T. Takata and H. Okabe</i>	1370
FT-IR study on interaction of irradiated deuteron with defects in $\text{Li}_2\text{O}$ , <i>H. Tanigawa, S. Tanaka, M. Enoeda and M. Akiba</i>	1291	Influence of blanket structural materials on liquid metal Pb-17Li flow in the FDS, <i>H. Wang, Y. Wu, Y. Ke, W. Wang and Q. Huang</i>	1374
Li ceramic pebbles chemical compatibility with Eurofer samples in fusion relevant conditions, <i>L.C. Alves, E. Alves, M.R. da Silva, A. Paúl and A. La Barbera</i>	1295	<b>Section 14. Compatibility and coatings</b>	
Non-stoichiometry of $\text{Li}_2\text{TiO}_3$ under hydrogen atmosphere conditions, <i>T. Hoshino, H. Kawamura, M. Dokiya, Y. Takahashi, T. Terai and M. Yamawaki</i>	1300	Corrosion behavior of EUROFER steel in flowing eutectic Pb-17Li alloy, <i>J. Konys, W. Krauss, Z. Voss and O. Wedemeyer</i>	1379
Thermo-mechanical testing of Li-ceramic for the helium cooled pebble bed (HCPB) breeding blanket, <i>G. Dell'Orco, A. Ancona, A. DiMaio, M. Simoncini and G. Vella</i>	1305	Corrosion behaviour of EUROFER in Pb-17Li at 500 °C, <i>K. Splíchal and M. Zmitko</i>	1384
Modeling of tritium release from ceramic breeder materials by focusing on transport process in breeder grain, <i>H. Okabe, K. Munakata, Y. Yokoyama, A. Koga, Y. Narisato, R.-D. Penzhorn and K. Okuno</i>	1309	High temperature oxidation behavior of ODS steels, <i>T. Kaito, T. Narita, S. Ukai and Y. Matsuda</i>	1388
Correlation between annihilation of radiation defects and tritium release in $\text{Li}_2\text{TiO}_3$ , <i>M. Oyaidzu, Y. Morimoto, H. Kodama, M. Sasaki, H. Kimura, K. Munakata, M. Okada, K. Kawamoto, H. Moriyama, M. Nishikawa and K. Okuno</i>	1313	Sodium compatibility of ODS steel at elevated temperature, <i>E. Yoshida and S. Kato</i>	1393
In-reactor experiment and the tritium diffusion coefficient in molten lithium-tin alloy, <i>Y. Kang and T. Terai</i>	1318	An overview on tritium permeation barrier development for WCLL blanket concept, <i>A. Aiello, A. Ciampichetti and G. Benamati</i>	1398
Mobilization measurements from Flibe under argon and air flow, <i>G. Smolik, R. Pawelko, Y. Morimoto, K. Okuno, R. Anderl, D. Petti and T. Terai</i>	1322	Crystallization behavior of arc-deposited ceramic barrier coatings, <i>F. Koch, R. Brill, H. Maier, D. Levchuk, A. Suzuki, T. Muroga and H. Bolt</i>	1403
Deuterium/tritium behavior in Flibe and Flibe-facing materials, <i>R.A. Anderl, S. Fukada, G.R. Smolik, R.J. Pawelko, S.T. Schuetz, J.P. Sharpe, B.J. Merrill, D.A. Petti, H. Nishimura, T. Terai and S. Tanaka</i>	1327	Al based coating on martensitic steel, <i>X. Li, G. Yu, J. Yu, K. Wang and Q. Huang</i>	1407
Materials selection and design of a hydrogen measurement device in Pb-17Li, <i>A. Ciampichetti, I. Ricapito, G. Benamati and M. Zucchetti</i>	1332	Properties of AlN coatings produced by RF sputtering method, <i>A. Sawada, A. Suzuki, T. Terai and T. Muroga</i>	1411
Non-destructive analysis of impurities in beryllium, affecting evaluation of the tritium breeding ratio, <i>Y. Verzilov, K. Ochiai, A. Klix, S. Sato, M. Wada, M. Yamauchi and T. Nishitani</i>	1337	Chemical formation of erbium oxide layer on V-4Cr-4Ti during exposure to liquid lithium doped with erbium, <i>Z. Yao, A. Suzuki, T. Muroga and K. Katakira</i>	1414
		Optimization of insulating coating formation technology on the structural materials for heavy liquid metal coolants, <i>S.S. Pinaev, E.V. Muraviev, A.V. Beznosov and A.A. Molodsov</i>	1419
		A conception of formation and operation of CaO coating in regime of self-healing, <i>O.I. Yeliseyeva, V.M. Chernov, M.M. Potapenko and T.V. Tsaran</i>	1424
		Thermodynamic stability of oxide, nitride, and carbide coating materials in liquid Sn-25Li, <i>S. Sharafat, N. Ghoniem and S. Zinkle</i>	1429

Radiation induced conductivity of ceramic coating materials under 14 MeV neutron irradiation, <i>T. Tanaka, A. Suzuki, T. Muroga, F. Sato, T. Iida and T. Nishitani</i>	1434	Effects of $\gamma$ -ray and neutron irradiation on electrical characteristic of proton-conducting polymer electrolyte membranes, <i>T. Adachi, S. Nagata, N. Ohtsu, B. Tsuchiya, K. Toh, N. Morishita, M. Yamauchi, N. Nishitani and T. Shikama</i>	1499
<b>Section 15. Ceramic materials and diagnostics</b>		Temperature dependence of radiation induced optical transmission loss in fused silica core optical fibers, <i>K. Okamoto, K. Toh, S. Nagata, B. Tsuchiya, T. Suzuki, N. Shamoto and T. Shikama</i>	1503
KU1 and KS-4V quartz glass lenses for remote handling and diagnostic optical transmission systems, <i>A. Morono, R. Vila and E.R. Hodgson</i>	1438	Luminescence in SiO <sub>2</sub> induced by MeV energy proton irradiation, <i>S. Nagata, S. Yamamoto, K. Toh, B. Tsuchiya, N. Ohtsu, T. Shikama and H. Naramoto</i>	1507
Laser induced damage enhancement due to stainless steel deposition on KS-4V and KU1 quartz glasses, <i>P. Martin, A. Morono and E.R. Hodgson</i>	1442	Electrical conductivities of dense and porous alumina under reactor irradiation, <i>B. Tsuchiya, T. Shikama, S. Nagata, K. Toh, M. Narui and M. Yamazaki</i>	1511
Radiation-induced disordering in magnesium aluminate spinel subjected to ionizing radiation, <i>M. Shimada, S. Matsumura, K. Yasuda, C. Kinoshita, Y. Chimi, N. Ishikawa and A. Iwase</i>	1446	Surface roughening and grain orientation dependence of the erosion of polycrystalline stainless steel by hydrogen irradiation, <i>M. Balden, A.F. Bardamid, A.I. Belyaeva, K.A. Slatin, J.W. Davis, A.A. Haasz, M. Poon, V.G. Kononov, I.V. Ryzhkov, A.N. Shapoval and V.S. Voitsenya</i>	1515
Influence of an electric field on the microstructure evolution of ion-irradiated alumina, <i>K. Yasuda, K. Tanaka, M. Shimada, T. Yamamoto, S. Matsumura and C. Kinoshita</i>	1451	Effect of Cr <sub>2</sub> O <sub>3</sub> and NiO dopants in $\alpha$ -Al <sub>2</sub> O <sub>3</sub> on its electrical conductivity under electron irradiation, <i>K. Shiiyama, A. Shiraiishi, M. Kutsuwada, S. Matsumura and C. Kinoshita</i>	1520
Radiation-hardening techniques of dedicated optical fibres used in plasma diagnostic systems in ITER, <i>B. Brichard, A. Fernandez Fernandez, H. Ooms, F. Berghmans, M. Decr�ton, A. Tomashuk, S. Klyamkin, M. Zabezhaiov, I. Nikolov, V. Bogatyrov, E. Hodgson, T. Kakuta, T. Shikama, T. Nishitani, A. Costley and G. Vayakis</i>	1456	RIEMF in MgO and Al <sub>2</sub> O <sub>3</sub> insulated MI cable ITER magnetic diagnostic coils, <i>R. Vila and E.R. Hodgson</i>	1524
Radiation-induced thermoelectric sensitivity in the mineral-insulated cable of magnetic diagnostic coils for ITER, <i>T. Nishitani, G. Vayakis, M. Yamauchi, T. Sugie, T. Kondoh, T. Shikama, E. Ishitsuka and H. Kawashima</i>	1461	<b>Section 16. Joining, processing and superconducting materials</b>	
Relation between macroscopic length change and the crystal structure in heavily neutron-irradiated ceramics, <i>M. Akiyoshi, N. Akasaka, Y. Tachi and T. Yano</i>	1466	Characterization of Eurofer-97 TIG-welded joints by FIMEC indentation tests, <i>R. Montanari, G. Filacchioni, B. Riccardi, M.E. Tata and G. Costanza</i>	1529
Neutron irradiation effects on isotope tailored aluminum nitride ceramics by a fast reactor up to $2 \times 10^{26}$ n/m <sup>2</sup> , <i>T. Yano, K. Inokuchi, M. Shikama, J. Ukai, S. Onose and T. Maruyama</i>	1471	Pressurized resistance welding technology development in 9Cr-ODS martensitic steels, <i>M. Seki, K. Hirako, S. Kono, Y. Kihara, T. Kaito and S. Ukai</i>	1534
Modification of optical properties of Be mirrors under bombardment by deuterium ions, <i>V.S. Voitsenya, A.F. Bardamid, V.N. Bondarenko, V.G. Kononov, D.V. Orlinskij, I.V. Ryzhkov, A.N. Shapoval, A.F. Shtan', S.I. Solodovchenko and K.Yu. Vukolov</i>	1476	Impact properties of NIFS-HEAT-2 (V-4Cr-4Ti) after YAG laser welding and neutron irradiation at 563 K, <i>T. Nagasaka, N.-J. Heo, T. Muroga, A. Nishimura, H. Watanabe, M. Narui and K. Shinozaki</i>	1539
Irradiation test of Mo- and W-mirrors for ITER by low energy deuterium ions, <i>T. Sugie, S. Kasai, M. Taniguchi, M. Nagatsu and T. Nishitani</i>	1481	Development of rapidly quenched brazing foils to join tungsten alloys with ferritic steel, <i>B.A. Kalin, V.T. Fedotov, O.N. Sevrjukov, A. Moeslang and M. Rohde</i>	1544
Neutron irradiation effects on properties of insulator coatings for ITER in-vessel components, <i>B.S. Rodchenkov, V.M. Ivanov, G.M. Kalinin, A.V. Kozlov, Yu.S. Strebkov and E.N. Scherbakov</i>	1486	Interfacial reactions and mechanical properties of W-SiC in-situ joints for plasma facing components, <i>S.J. Son, K.H. Park, Y. Katoh and A. Kohyama</i>	1549
Non-linear optical properties of silica-glass-core-fiber waveguides under intense pulsed reactor irradiation, <i>O.A. Plaksin, N. Kishimoto and T. Shikama</i>	1490	Manufacturing study of Be, W and CFC bonded structures for plasma-facing components, <i>M. Onozuka, S. Hirai, K. Kikuchi, Y. Oda and K. Shimizu</i>	1553
Optical characteristics of aluminum coated fused silica core fibers under 14 MeV fusion neutron irradiation, <i>K. Toh, T. Shikama, S. Nagata, B. Tsuchiya, T. Suzuki, K. Okamoto, N. Shamoto, M. Yamauchi and T. Nishitani</i>	1495	Microstructural evolution and hardness changes in the interface of Cu/316L joint materials under aging and ion irradiation, <i>Q. Xu, T. Yoshiie, T. Muroga, N. Yoshida, T. Iwai and D.J. Edwards</i>	1558
		Direct joining of CFC to copper, <i>P. Appendino, M. Ferraris, V. Casalegno, M. Salvo, M. Merola and M. Grattarola</i>	1563
		Elastic-plastic FEM analysis on low cycle fatigue behavior for alumina dispersion-strengthened copper/stainless steel joint, <i>H. Nishi</i>	1567

Calculation of electronic structure at bonding interface between vanadium and oxide ceramics for insulator coating applications, <i>M. Satou, N. Komatsu, T. Sawada and K. Abe</i>	1571	blanket designs with SiC <sub>f</sub> /SiC, <i>A.Y. Ying, T. Yokomine, A. Shimizu, M. Abdou and A. Kohyama</i>	1605
Desorption of water from iron oxide by laser irradiation, <i>K. Chiba, S. Tanaka and T. Yoneoka</i>	1575	Waste management for JAERI fusion reactors, <i>K. Toba, S. Nishio, S. Konishi and S. Jitsukawa</i>	1610
Microstructure and superconductivity of V-based Laves-phase superconductor tape synthesized by a rapidly-heating/quenching process, <i>Y. Hishinuma, A. Kikuchi, Y. Iijima, Y. Yoshida, T. Takeuchi, A. Nishimura and K. Inoue</i>	1580	Specification of stress limits for irradiated 316L(N)-IG steel in ITER structural design criteria, <i>G.M. Kalinin, B.S. Rodchenkov and V.A. Pechenkin</i>	1615
Damage evolution under bending and tensile stress and its influence on critical current of Bi2223/Ag superconducting composite tape, <i>S. Ochiai, N. Miyazaki, D. Doko, T. Nagai, M. Nakamura, H. Okuda, S.S. Oh, M. Hojo, M. Tanaka and K. Osamura</i>	1585	Irradiation and penetration tests of boron-doped low activation concrete using 2.45 and 14 MeV neutron sources, <i>A. Morioka, S. Sato, M. Kinno, A. Sakasai, J. Hori, K. Ochiai, M. Yamauchi, T. Nishitani, A. Kaminaga, K. Masaki, S. Sakurai, T. Hayashi, M. Matsukawa, H. Tamai and S. Ishida</i>	1619
Induced activity of several candidate superconductor materials in a tokamak-type fusion reactor, <i>T. Noda, T. Takeuchi and M. Fujita</i>	1590	Tritium uptake by SS316 and its decontamination, <i>Y. Torikai, R.-D. Penzhorn, M. Matsuyama and K. Watanabe</i>	1624
<b>Section 17. Blanket design, database and radiological safety</b>		Activation experiment with tungsten in fusion peak neutron field, <i>K. Seidel, R. Eichin, R.A. Forrest, H. Freiesleben, S.A. Goncharov, V.D. Kovalchuk, D.V. Markovskij, D.V. Maximov and S. Unholzer</i>	1629
Development of a helium-cooled divertor concept: design-related requirements on materials and fabrication technology, <i>P. Norajitra, L.V. Boccaccini, E. Diegele, V. Filatov, A. Gervash, R. Giniyatulin, S. Gordeev, V. Heinzl, G. Janeschitz, J. Konys, W. Krauss, R. Kruessmann, S. Malang, I. Mazul, A. Moeslang, C. Petersen, G. Reimann, M. Rieth, G. Rizzi, M. Rumyantsev, R. Ruprecht and V. Slobodtchouk</i>	1594	Extending the energy range of materials activation modelling, <i>R.A. Forrest</i>	1633
APEX advanced ferritic steel, Flibe self-cooled first wall and blanket design, <i>C.P.C. Wong, S. Malang, M. Sawan, I. Sviatoslavsky, E. Mogahed, S. Smolentsev, S. Majumdar, B. Merrill, R. Mattas, M. Friend, J. Bolin and S. Sharafat</i>	1599	Measurement and analysis of radioactivity induced in CuCrZr by D–T neutrons, <i>R. Eichin, C. Adelhelm, A.I. Blokhin, R.A. Forrest, H. Freiesleben, V.D. Kovalchuk, D.V. Markovskij, K. Seidel and S. Unholzer</i>	1638
Impact of material system thermomechanics and thermofluid performance on He-cooled ceramic breeder		Transmutation and activation of reduced activation ferritic martensitic steel in molten salt cooled fusion power plants, <i>E.T. Cheng</i>	1643
		Radioactivity of the vanadium-alloy induced by D–T neutron irradiation, <i>S. Sato, T. Tanaka, J. Hori, K. Ochiai, T. Nishitani and T. Muroga</i>	1648
		Fusion reactor radioactive materials and national waste management regulations, <i>M. Zucchetti and A. Ciampichetti</i>	1653
		Author index Parts A and B . . . . .	1659
		Subject index Parts A and B . . . . .	1687