9.2 HFIR Irradiation Experiments – December 31, 2013 — Y. Katoh (Oak Ridge National Laboratory)

Summary of Recent, Current and Planned Fusion Materials Program Experiments

Experiment Designation	Primary Materials	Specimen Types*	Irradiation Temperature (°C)	Max Exposure (dpa)	Number of Reactor Cycles	Irradiation Period (month/year)		
Beryllium reflector (RB) irradiation positions								
RB-15J	F82H	T, F, FT	300, 400	6	10	6/08	–	12/09
Target zone full-length capsules								
JP-25	F82H	T, FT	300, 500	20	10	2/99	–	1/01
JP-26	F82H	T, FT	300,400,500	9	5	12/03	–	11/04
JP-27	F82H	T, FT	300, 400	21	13	12/03	–	1/08
JP-28	F82H	T, FT	300,400,500	80	46	4/05	–	7/13
JP-29	F82H	T, FT	300,400,500	80	46	1/05	–	7/13
12-DCT	F82H	DCT	50	1.6	1	8/11	–	8/11
JP-30	F82H	T, FT	300,400,650	20	~10	11/11	–	8/13
JP-31	F82H	T, FT	300,400,650	20	~10	11/11	–	8/13
Target zone rabbit capsules (DOE-JAEA)								
F8A1	F82H	T, FT	300	50	29	2/09	–	7/13
F8A2	“	“	“	“	“	“	–	“
F8B1	“	“	“	“	“	“	–	“
F8B2	“	“	“	“	“	“	–	“
JCR-1	SiC/SiC	Bend bars	800	30	15	10/04	–	1/09
JCR-2	“	“	“	“	“	“	–	“
JCR-3	“	“	“	“	“	“	–	“
JCR-4	“	“	“	“	“	“	–	“
JCR-5	“	“	“	>50	>25	10/04	–	2/11
JCR-6	“	“	“	“	“	“	–	“
JCR-7	“	“	“	“	“	“	–	“
JCR-8	“	“	“	“	“	“	–	“
JCR-9	“	“	500	30	15	10/04	–	1/09
JCR-10	“	“	“	“	“	“	–	“
JCR-11	“	“	“	“	“	“	–	“
JCR-12	“	“	“	“	“	“	–	“
F11A3	F82H	T, FT	300	20	12	5/11	–	2/13
F11A4	“	“	“	“	“	“	–	“
F11B3	“	“	“	“	“	“	–	“
M4-TEN	F82H	DCT	50	1.6	1	8/11	–	8/11

JCR11-01	SiC/SiC	Bend bars	950	50	25	11/12	–	
JCR11-02	SiC/SiC	Bend bars	950	10	5	10/12	–	8/13
JCR11-03	SiC/SiC	Bend bars	950	30	15	5/13	–	
JCR11-04	SiC/SiC	Bend bars	950	30	15	5/13	–	
JCR11-05	SiC/SiC	Bend bars	950	50	25	10/12	–	
JCR11-06	SiC/SiC	Bend bars	950	10	5	10/12	–	7/13
JCR11-07	SiC/SiC	Bend bars	950	100	50	10/12	–	
JCR11-08	SiC/SiC	Bend bars	950	100	50	10/12	–	
JCR11-09	SiC/SiC	UDMC	950	4	2	6/13	–	11/13
JCR11-10	SiC/SiC	UDMC	950	10	5	6/13	–	
JCR11-11	SiC/SiC	UDMC	950	30	15	6/13	–	
JCR11-12	SiC/SiC	UDMC	950	100	50	6/13	–	
F13A5	F82H	T, FT	300	10	9	1/14	–	
F13A6	F82H	T, FT	300	20	18	1/14	–	
F13B4	F82H	T, FT	300	10	9	1/14	–	
F13B5	F82H	T, FT	300	20	18	1/14	–	
Target zone rabbit capsules (TITAN)								
T8A1	SiC	BSR	300	0.01	HT**	10/09	–	10/09
T8A2	SiC	BSR	300	0.1	HT	10/09	–	10/09
T8B1	SiC	BSR	500	0.01	HT	10/09	–	10/09
T8B2	SiC	BSR	500	0.1	HT	10/09	–	10/09
T8C1	SiC	BSR	500	~1	1	5/09	–	6/09
T8D1	SiC	BSR	800	0.1	HT	3/11	–	10/09
T8E1	SiC	BSR	800	~1	1	8/09	–	8/09
T8F1	SiC	BSR	1200	~1	1	8/09	–	8/09
T9A1	W, Ni	Discs	90	0.1	HT	1/09	–	10/09
T9A2	W, Ni	Discs	90	1.2	1	1/09	–	1/09
T9C1	Steels	T, MC	500	5.5	3	11/09	–	2/10
T9C2	Steels	T, MC	500	9.6	5	11/09	–	6/10
T9G1	Steels	T, MC	300	1.2	1	6/09	–	8/09
T9G2	Steels	T, MC	300	9.6	8	6/09	–	8/11
MTTN01	Steels	T, MC	300	4.8	4	1/12	–	8/11
300-LD-1	Steels	SSJ, MC	300	2	1	5/12	–	6/12
300-HD-1	Steels	SSJ, MC	300	12	6	5/12	–	2/13
500-LD-1	Steels	SSJ, MC	500	2	1	5/12	–	6/12
500-HD-1	Steels	SSJ, MC	500	12	6	5/12	–	2/13
500-HD-2	Steels	SSJ, MC	500	12	6	5/12	–	2/13
500-HD-3	Steels	SSJ, MC	500	12	6	5/12	–	2/13
650-LD-1	Steels	SSJ, MC	650	2	1	5/12	–	6/12
650-LD-2	Steels	SSJ, MC	650	2	1	5/12	–	6/12
650-HD-1	Steels	SSJ, MC	650	12	6	5/12	–	2/13
650-HD-2	Steels	SSJ, MC	650	12	6	5/12	–	2/13
300-LD-2	Steels, W	SSJ, MC	300	2	2	7/12	–	8/12
300-MD-1	Steels, W	SSJ, MC	300	7	4	7/12	–	2/13
500-LD-2	Steels, W	SSJ, MC	500	2	2	1/13	–	7/13

300-LD-3	Steels, W	SSJ, MC	300	2	2	7/12	–	11/12
300-HD-2	Steels, W	SSJ, MC	300	12	8	7/12	–	2/14
500-LD-3	Steels, W	SSJ, MC	500	2	1	7/12	–	8/12
500-HD-4	Steels, W	SSJ, MC	500	12	6	7/12	–	7/13
650-LD-3	Steels, W	SSJ, MC	650	2	2	10/12	–	7/13
650-HD-3	Steels, W	SSJ, MC	650	12	8	7/12	–	11/13
PC1	Various	SSJ, MC	80/100	0.02	HT	6/12	–	6/12
PC1A	Various	SSJ, MC	80/100	0.02	HT	6/12	–	6/12
PC2	Various	SSJ, MC	80/100	0.1	HT	6/12	–	6/12
PC2A	Various	SSJ, MC	80/100	0.1	HT	6/12	–	6/12
PC3	Various	SSJ, MC	80/100	0.5	HT	6/12	–	7/12
PC3A	Various	SSJ, MC	80/100	0.5	HT	6/12	–	7/12
PC4	Various	SSJ, MC	80/100	2	1	6/12	–	7/12
PC4A	Various	SSJ, MC	80/100	2	1	6/12	–	7/12
PC5	Various	SSJ, MC	80/100	20	9	6/12	–	11/13
TB-300-1	Steels, W	SSJ, MC	300	0.02	HT	8/12	–	8/12
TB-300-2	Steels, W	SSJ, MC	300	0.1	HT	8/12	–	8/12
TB-300-3	Steels, W	SSJ, MC	300	0.5	HT	8/12	–	8/12
TB-300-4	Steels, W	SSJ, MC	300	7	5	7/12	–	6/13
TB-500-1	Steels, W	SSJ, MC	500	0.1	HT	8/12	–	8/12
TB-500-2	Steels, W	SSJ, MC	500	0.5	HT	8/12	–	8/12
TB-500-3	Steels, W	SSJ, MC	500	7	4	7/12	–	2/13
TB-650-1	Steels, W	SSJ, MC	650	0.1	HT	8/12	–	8/12
TB-650-2	Steels, W	SSJ, MC	650	0.5	HT	8/12	–	8/12
TB-650-3	Steels, W	SSJ, MC	650	7	5	7/12	–	6/13
TB-650-4	Steels, W	SSJ, MC	650	20	11	7/12	–	
TTN09	SiC	Joint	500	3.4	2	8/11	–	11/11
TTN10	SiC	Joint	500	4.1	2	8/11	–	11/11
TTN11	SiC	Joint	800	4	2	3/12	–	5/12
TTN01	SiC	BSR	300	1	1	2/11	–	3/11
TTN02	SiC	BSR	300	10	6	2/11	–	12/11
TTN03	SiC	BSR	300	20	11	2/11	–	8/13
TTN04	SiC	BSR	500	10	6	5/11	–	4/12
TTN05	SiC	BSR	500	20	11	5/11	–	8/13
TTN06	SiC	BSR	800	10	6	5/11	–	4/12
TTN07	SiC	BSR	800	20	11	5/11	–	8/13
TTN08	SiC	BSR	1200	10	6	5/11	–	8/12
TTN16	SiC	Fiber BSR	500	1	1	11/11	–	12/11
TTN17	SiC	Fiber BSR	500	10	6	8/11	–	6/12
TTN18	SiC	Fiber BSR	500	20	11	8/11	–	8/13
TTN19	SiC	Fiber BSR	1200	1	1	3/12	–	4/12
TTN20	SiC	Fiber BSR	1200	10	6	3/12	–	11/12
Target zone rabbit capsules (US-TITAN-JAEA)								
T11-01J	V-4Cr-4Ti	BTC	425	2	1	11/12	–	12/12
T11-02J	V-4Cr-4Ti	BTC	425	6	3	1/13	–	7/13

T11-03J	V-4Cr-4Ti	BTC	425	2	1	11/12	–	12/12
T11-04J	V-4Cr-4Ti	BTC	425	6	3	1/13	–	7/13
T11-05J	SiC	BTC	600	2	1	11/12	–	12/12
T11-06J	SiC	BTC	600	6	3	1/13	–	7/13
T11-08J	SiC	BTC	600	6	3	1/13	–	7/13
T11-09J	SiC	BTC	600	2	1	11/12	–	12/12
T11-11J	SiC	BTC	600	2	1	11/12	–	12/12
T11-13J	Graphite	BTC	600	2	1	11/12	–	12/12
T11-14J	Graphite	BTC	600	6	3	1/13	–	7/13
J12-01	F82H	BTC	300	1.5	1	1/13	–	2/13
J12-02	F82H	BTC	300	6	3	5/13	–	7/13
J12-03	F82H	BTC	300	1.5	1	5/13	–	2/13
J12-04	F82H	BTC	300	6	3	1/13	–	6/13
J12-05	F82H	BTC	300	1.5	1	1/13	–	2/13
J12-06	F82H	BTC	300	6	3	5/13	–	6/13
Target zone rabbit capsules (US-IMR)								
MX-1	Ceramics	Various	400	2	1	7/13	–	8/13
MX-2	Ceramics	Various	400	TBD	TBD	7/13	–	
MX-3	Ceramics	Various	400	10	6	7/13	–	
MX-4	Ceramics	Various	700	2	1	7/13	–	8/13
MX-5	Ceramics	Various	700	TBD	TBD	7/13	–	
MX-6	Ceramics	Various	700	10	5	7/13	–	
MX-7	Ceramics	Various	1000	2	1	7/13	–	8/13
MX-8	Ceramics	Various	1000	TBD	TBD	7/13	–	
MX-9	Ceramics	Various	1000	10	5	7/13	–	

*T = Tensile, F = Fatigue, FT = Fracture Toughness, MC = Multipurpose Coupon, BSR = Bend Stress Relaxation Creep, DCT = Disc Compact Tension, BTC: Bellows-loaded Tensile Creep, UDMC: Uni-directional Mini-composite. Most experiments also contain TEM disks, other special purpose specimens, and monitors occupying small spaces.
**Hydraulic tube – fractional cycle exposures.