

**SCHEDULE AND STATUS OF IRRADIATION EXPERIMENTS – A. F. Rowcliffe (Oak Ridge National Laboratory)**

**OBJECTIVE**

To provide an updated summary of the status of irradiation experiments for the fusion materials program.

**SUMMARY**

The current status of reactor irradiation experiments is presented in tables summarizing the experimental objectives, conditions, and schedule.

**PROGRESS AND STATUS**

Currently, there are three experiments in-reactor (RB-10J, RB-14J, and JP-25). Post-irradiation testing is in progress on CTR-62/63 and RB-11J/12J. Experiments TRIST-TC1 and RB-13J have been removed from reactor and are awaiting disassembly.









Summary of Reactor Irradiation Experiments										
Experiment	Lead Lab	Collaborators	Responsible Person	Major Objectives	Materials	Temperature °C	Dose (dpa) or fluence	Irrad. Start	Irrad. Finish	Status
EBR-II, Reactor, ANL, Idaho Falls, ID										
COBRA 1A2	PNL	ORNL, ANL, MONBUSHO	M.L. Hamilton	Tensile and fatigue prop., Charpy impact, fracture toughness, TEM	Austenitic and ferritic steels, Fe-alloys, V, Be, low act. materials, Cu alloys, Ti-Al, SiC, C-C comp.	370, 400, 800	33	Nov-92	Sep-94	
X530	ANL		H. Tsai, H.M. Chung	He-effects, swelling, Charpy impact, fracture toughness, tensile prop.	V alloys	370	5	Aug-94	Sep-94	
High Flux Isotope Reactor, ORNL, Oak Ridge, TN										
HFIR-CTR-60	ORNL		S.J. Zinkle	Flexure bars, TEM, Indentation disks	Isotopically tailored ceramics	100-600	2.4E+26 n/m <sup>2</sup>	Dec-94	Aug-95	
HFIR-CTR-61	ORNL		S.J. Zinkle	Similar to HFIR-CTR-60			7.20E+26	Dec-94	Aug-98	
HFIR-JP-9	ORNL	JAERI	P.J. Maziasz/ J.E. Pawel	He effects by isotopic tailoring, tensile prop., TEM	Austenitic and ferritic steels	300-600	57	Jul-90	Apr-94	
HFIR-JP-12	ORNL	JAERI	P.J. Maziasz/ J.E. Pawel	Similar to HFIR-JP-9			57	Jul-90	Apr-94	
HFIR-JP-15	ORNL	JAERI	P.J. Maziasz/ J.E. Pawel	Similar to HFIR-JP-9			57	Jul-90	Apr-94	
HFIR-JP-20	ORNL	JAERI	J.E. Pawel	Tensile Prop., TEM, He effects by isotopic tailoring	Austenitic and ferritic steels	300-600	8	Dec-93	Jun-94	
HFIR-JP-21	ORNL	JAERI	J.E. Pawel	Similar to HFIR-JP-20			18	Dec-93	Apr-95	
HFIR-JP-22	ORNL	JAERI	J.E. Pawel	Similar to HFIR-JP-20			34	Dec-93	Jan-96	
HFIR-JP-23	PNL	MONBUSHO	D.S. Gelles	TEM	Austenitic and ferritic steels, Cu, Mo, V alloys, TiAl	300-600	8	Dec-93	Jun-94	
HFIR-HT-S1, -S7	ORNL		L.L. Snead	Thermal conductivity	Various Insulators	80-350	0.01-1.0	Jun-95	Aug-95	
HFIR-HT-F Series	ORNL		L. L. Snead	Fiber tensile	SC	80-800	0.001-1.0	Jan-95	Mar-96	

Summary of Reactor Irradiation Experiments										
Experiment	Lead Lab	Collaborators	Responsible Person	Major Objectives	Materials	Temperature °C	Dose (dpa) or fluence	Irrad. Start	Irrad. Finish	Status
HFIR-TRIST-ER1	ORNL	MONBUSHO/JAERI	S.J. Zinkle	In-situ electrical conductivity	Al <sub>2</sub> O <sub>3</sub>	450	3E+25 n/m <sup>2</sup>	Apr-96	Jun-96	
HFIR-RB-10J	ORNL	JAERI	J.E. Pawel	Tensile, fracture	Vanadium, 316LN-1G, J316	200, 500	5	Oct-98	Oct-99	
HFIR-RB-11J	ORNL	MONBUSHO/JAERI	M. L. Grossbeck	Tensile, fracture, TEM	Low activation ferritics, V alloys, SiC	300	5	Feb-97	May-98	
HFIR-RB-12J	ORNL	MONBUSHO/JAERI	M. L. Grossbeck	Tensile, fracture, TEM	Low activation ferritics, V alloys, SiC	500	5	Feb-97	May-98	
HFIR-RB-13J	ORNL	MONBUSHO/JAERI	S. J. Zinkle	Varying temp. experiment	Ceramics, Fe-Cr-Ni, V alloys, ferritics, copper	200, 350, 500	5	Jul-98	Jul-99	
HFIR-RB-14J	ORNL	MONBUSHO	L. L. Snead	Strength, fracture, dim. stability, diffusivity	2nd generation SiC/SiC	300, 500, 800	5	Feb-99	Feb-00	
HFIR-TRIST-TC1	ORNL	MONBUSHO/JAERI	L. L. Snead	In-situ thermal conductivity	SiC/SiC, SiC	150-700	3	Jan-99	Dec-99	
HFIR-CTR-62	ORNL	JAERI	R.L. Klueh	Charpy impact and He effects	and conventional ferritic steels	300, 400	13	Apr-95	Dec-95	
HFIR-CTR-63	ORNL	JAERI	R.L. Klueh	Charpy impact and tensile, TEM, He effects	and conventional ferritic steels	300, 400	13	Apr-95	Dec-95	
HFIR-JP25	ORNL	JAERI	R.L. Klueh	Tensile, fracture, TEM	Low activation ferritics	300, 500	20	Feb-99	Jan-00	
<b>High Flux Beam Reactor, Brookhaven National Laboratory</b>										
HFBR-ISEC-3	ORNL		L.L. Snead	In-situ electrical	WESGO Al <sub>2</sub> O <sub>3</sub>	450	1.5	Jul-95	Sep-95	
HFBR-V1	ORNL		L.L. Snead	Tensile, fracture	V-4Cr-4Ti	75, 150, 225	0.4	May-95	Jun-95	
HFBR-V2	ORNL		L.L. Snead	Tensile, fracture	V-4Cr-4Ti	75, 225, 300, 375	0.4	Jul-95	Aug-95	
HFBR-V3	ORNL		L.L. Snead	Tensile, fracture	V-4Cr-4Ti	160, 265, 315, 420	0.4	Aug-96	Sep-96	
HFBR-V4	ORNL		L.L. Snead	Tensile, fracture	V-4Cr-4Ti	105-505	0.1	Aug-96	Sep-96	

Summary of Reactor Irradiation Experiments										
Experiment	Lead Lab	Collaborators	Responsible Person	Major Objectives	Materials	Temperature °C	Dose (dpa) or fluence	Irrad. Start	Irrad. Finish	Status
<b>Advanced Test Reactor, Idaho Falls</b>										
ATR-A1	ANL	MONBUSHO	D.L. Smith	Tensile, fracture toughness, TEM, creep	Vanadium alloys	200, 300	5	Dec-95	May-96	
<b>BOR-60 Reactor, RIAR, Dimitrovgrad, Russia</b>										
BOR-60-Fusion-1	ORNL, ANL	RDIFE, RIAR	A.F. Rowcliffe, D.L. Smith	Mechanical and microstructural properties	V alloys	350-380	10	Jul-95	Mar-96	
<b>SM-2 Reactor, RIAR, Dimitrovgrad, Russia</b>										
SM-2.1	ORNL, PNL	RIAR	S.J. Zinkle	Tensile, electrical, microstructural, and creep properties	Cu alloys	100, 200, 330	1, 5	Dec-93	Feb-94	
SM-2.2	PNL	SRIAR	D.J. Edwards	Mechanical behavior of bonded materials	Cu alloys/SS, Cu/Be	120, 300	0.2	Mar-96	May-96	
SM-2.3	PNL	SRIAR	D.J. Edwards	Mechanical behavior of bonded materials	Cu alloys/SS, Cu/Be	150, 300, 200	0.4, 2.0	Sep-97, Jul-98	Dec-97, Oct-98	
	Irradiation complete									
	Irradiation in progress									
	Irradiation planned									