

## **A Scanning Electron Microscope for Micro-surface Analysis of Spent Fuel**

150

### **Abstract**

The examination of spent fuels and radioactive materials by using scanning electron microscope plays an important role in their development for energy systems as well as providing data for basic mechanism involved in corrosion, radiation damage, fracture, etc. To conduct this type of work, the SEM was modified and installed in shielded glove box. The specimen of the spent fuel was made of conductive resin, and the specimen of the irradiated cladding tube was made of general resin. In the micro-surface analysis of the spent nuclear fuel, the spent nuclear fuel has many pore. In the micro-surface analysis of the irradiated cladding tube, also, the irradiated cladding tube has an oxide layer and hydride.

(Scanning Electron Microscope)

(pore)

(bubble)

가

2  
Electron Detector)가  
Syetem)

(Secondary Electron Detector),  
PHILIPS

XL-30

EDX(Energy Dispersive X-ray  
(detector)

(shielded glove box)

(Backscattered

가

(manipulator)

, 가

가

가

1.

[1 6]

0.5 Sv/h 1.26 Sv/h

가

, 50 GWD/MTU, 3 , 0.5 Sv/h  
 0.17 gr 0.2 ci 가 . 5%  
 , 가 ,  
 PHILIPS XL-30 가 , 가  
 , 가 . ,  
 , 6m ,  
 20 cm 30 cm ,  
 (column) 3 cm 5 cm  
 가 .  
 (frame) . LaB6 (scan filtering)  
 (noise) FEG  
 , (holder) .

2.

[7] (Radiological  
 Protection Regulations) .

(utility lines) ( , ,  
 ) (port) , 가 ,  
 ANISN code 16.5 cm  
 17 cm , 2.07m, 2.62m, 2.62m .  
 1 , 2

2

J44-M05 TMI

(tape)

(paste)

9407

1

2

J12-A13

가 25 kV, Spot Size 5.0

1.

			(MWD/MTU)	(m Sv/h)		
				@ 1 cm	@	
M05 - 9S		# 2, J44	35,709	88	140	'92.5.9 , Etching, 0.5 mm(t)
M05 - 51S	"	"	"	240	520	"
M05 - 52S	"	"	"	285	670	'92.5.9 , Polishing, 0.5 mm(t)
TMI - 1	"	TMI		7.5		Etching, 0.2 mm(t)
A13 - 7		# 2, J12	7,210	0.46		'97.5.6 , Polishing

TMI

2

(J44-M05)

가

TMI

(TMI-1) 0.0075 Sv/h , 가

2

(M05-51S) 0.52 Sv/h

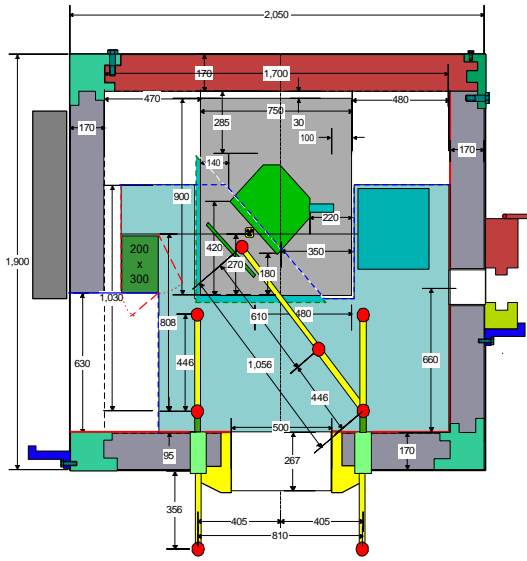
TMI

TMI-

1 20000 ,

boundary)가  
 3 20000 TMI  
 4 2 J44-M05 (grain  
 5 2 J44-M05  
 6 2 J12-A13  
 [8]

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- [3] ORNL, "Scanning Electron Microscope Facility for Examination of Radioactive Materials", ORNL/TM-9451, 1985.
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- [6] CDNG, "Laboratories Chauds et Telemanipulations de La C.E.E." CEA-CONF 5723, 1981.
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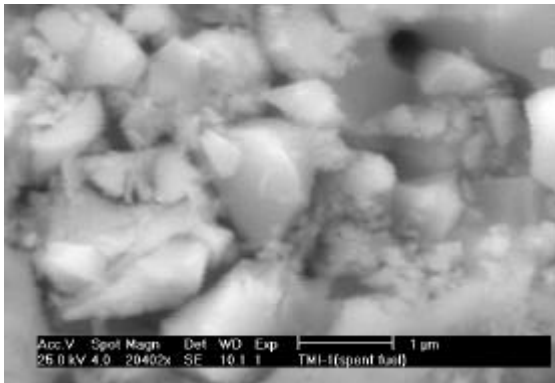


1.

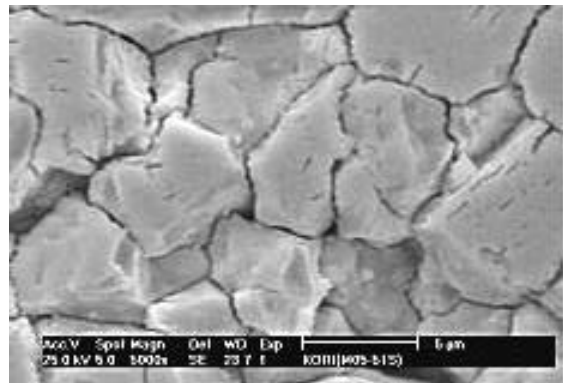


2.

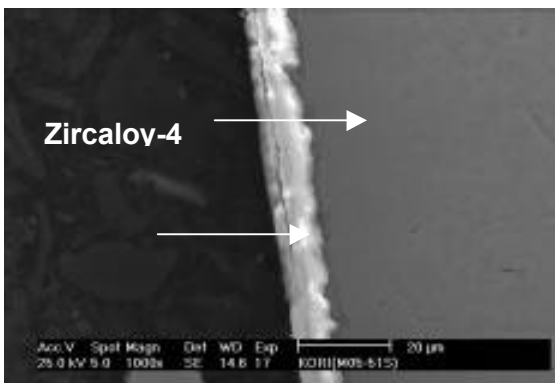
SEM



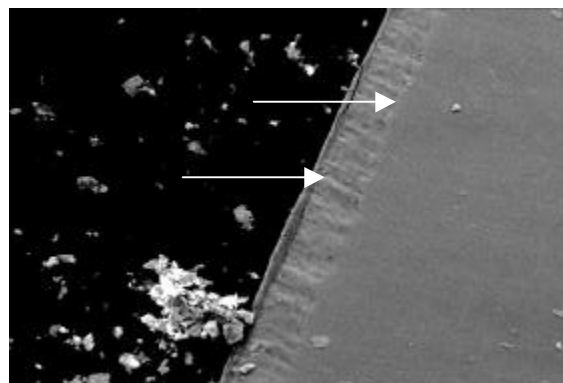
3. TMI-1(X20,000, 7.5 m Sv/h @1 cm)



4. M05-51S(X5,000, 520 m Sv/h @ )



5. 2 J44-M05(X1,000)



6. 2 J12-A13(X500)