

Appendix E

ESEM and SEM/EDS Data for Test #4 Day-30 Deposition Products

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For the ICET tests, of interest is the corrosion/reaction effect of metal and concrete coupons, as well as the deposition of debris in the tank. To understand the corrosion processes that have occurred in the test, one direct way is the examination of the corrosion/deposition products after the test is completed. For this purpose, the corrosion/deposition products were collected on the date Test #4 was shut down (June 23, 2005). These products are fine powders on the submerged CPVC rack.

These products were collected by directly adhering onto double sided carbon tapes for probe SEM/EDS examination. After the samples were dried in air, Au/Pd coating was applied to enhance the surface conductivity of the samples and to prevent possible charging problems during SEM examination. Based on EDS results, a semi-quantitative elemental analysis was performed after calibration. This appendix presents the SEM/EDS data that were obtained on June 29, 2005.

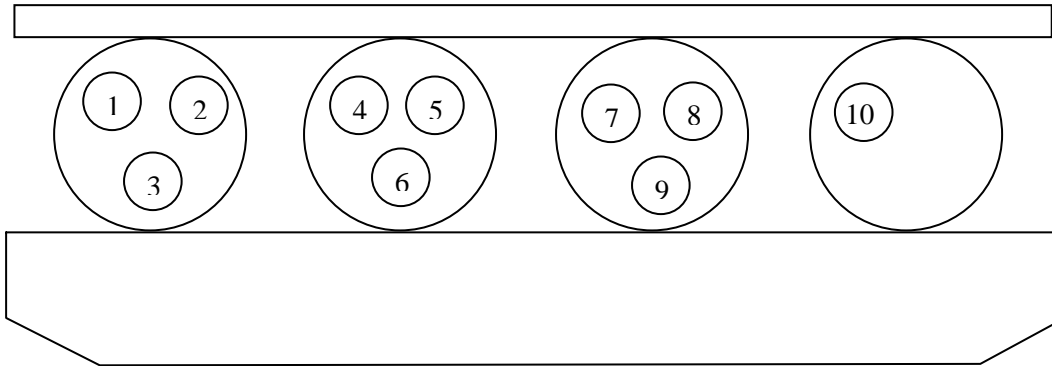
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Transcribed Laboratory Log

Laboratory session from June 29, 2005.

ESEM Test #4 Day-30 Deposition Products.

- | | | | |
|-----------------|-------------------------|-------------------|---------------|
| 1. Suspended Al | 3. Sus. Cu | 5. Sus. Gal-Steel | 7. Sus. Steel |
| 2. Submerged Al | 4. Sub. Cu | 6. Sub. Gal Steel | 8. Sub. Steel |
| 9. Sediment | 10. Powder on sub. Rack | | |



Powder on Submerged Rack.

Image:	T4D30RackPowder029	500 ×	ESEM image	Figure E-1
	T4D30RackPowder030	1000 ×	ESEM at higher magnification	Figure E-2
EDS:	T4D30RackPowder018		EDS of whole of image 30	Figure E-3

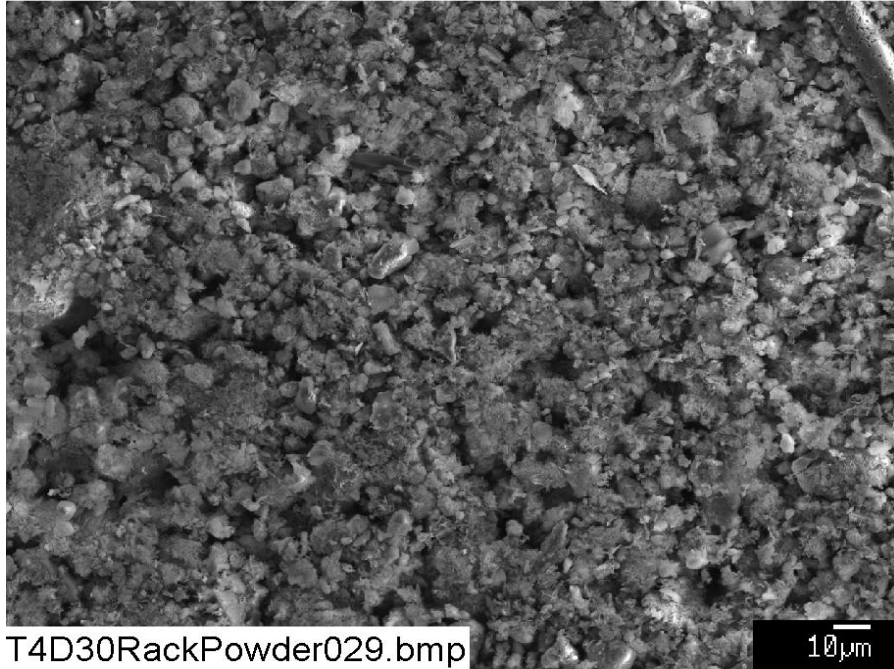


Figure E-1: SEM image magnified 500 times for a Test #4 Day-30 fine powder on the submerged rack. (T4D30RackPowder029.bmp)

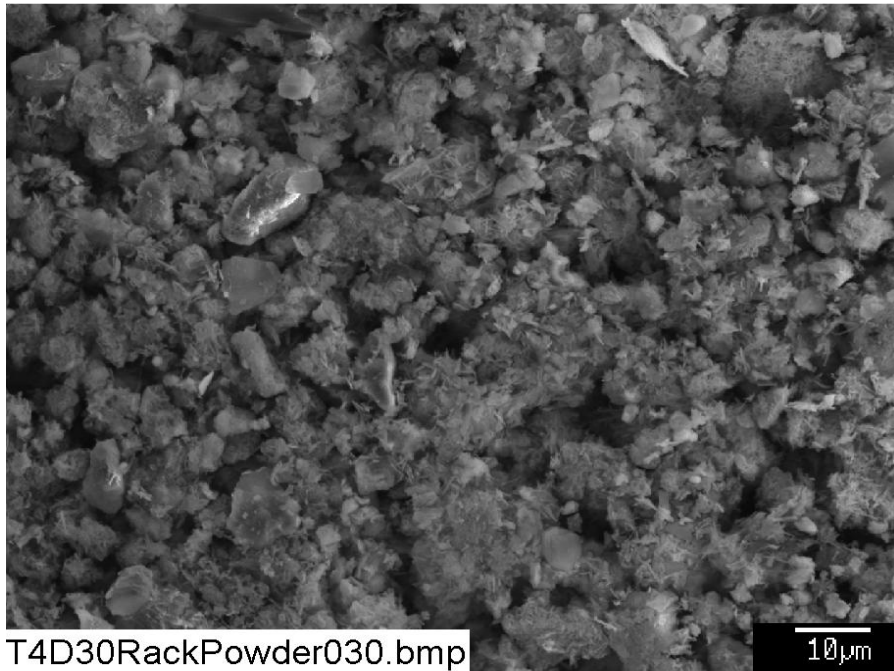


Figure E-2: SEM image magnified 1000 times for a Test #4 Day-30 fine powder on the submerged rack. (T4D30RackPowder030.bmp)

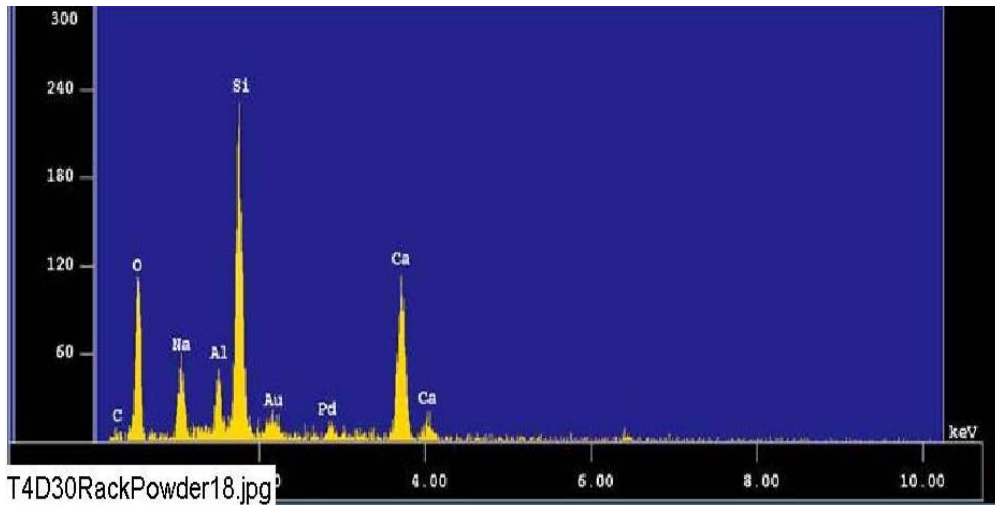


Figure E-3: EDS counting spectrum for the particles (whole image) shown in Figure E-2. (T4D30Rackpowder18.jpg)

The results from the chemical composition analysis for T4D30RackPowder18.jpg are given in Table E-1.

Table E-1. Chemical Compositions for T4D30RackPowder18.jpg, Figure E-3.

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Group       : NRC
Sample      : T4D30 ID# : 18
Comment     : powder on submerged rack
Condition   : Full Scale : 20KeV(10eV/ch,2Kch)
              Live Time  : 60.000 sec   Aperture #   : 2
              Acc. Volt   : 15.0 KV      Probe Current : 1.068E-09 A
              Stage Point : X=86.234 Y=59.512 Z=11.000
              Acq. Date   : Wed Jun 29 15:53:49 2005
    
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Element	Mode	ROI (KeV)	K-ratio(%)	+/-	Net/Background	
O K	Normal	0.25- 0.77	30.9731	0.0014	1027 /	3
Na K	Normal	0.81- 1.27	4.6719	0.0006	445 /	8
Al K	Normal	1.26- 1.78	2.8315	0.0004	390 /	71
Si K	Normal	1.50- 2.07	10.6068	0.0007	1361 /	32
Ca K	Normal	3.40- 4.30	15.8585	0.0055	989 /	5
C K	Normal	0.09- 0.46	0.1513	0.0001	7 /	10

 Chi_square = 1.6428

Element	Mass%	Atomic%	ZAP	Z	A	F
O	51.787	66.6327	1.3652	0.9856	1.3851	1.0000
Na	8.112	7.2632	1.4177	1.0401	1.3635	0.9996
Al	4.182	3.1907	1.2060	1.0015	1.2094	0.9957
Si	15.974	11.7078	1.2296	0.9896	1.2431	0.9995
Ca	19.144	9.8324	0.9857	0.9980	0.9875	1.0001
C	0.801	1.3733	4.3237	1.0335	4.1836	0.9999

 Total 100.000 100.0000
 Normalization factor = 1.2247