SEM Images
FAL Sample Exposed for 500 Hours
(FAL Sample #1)

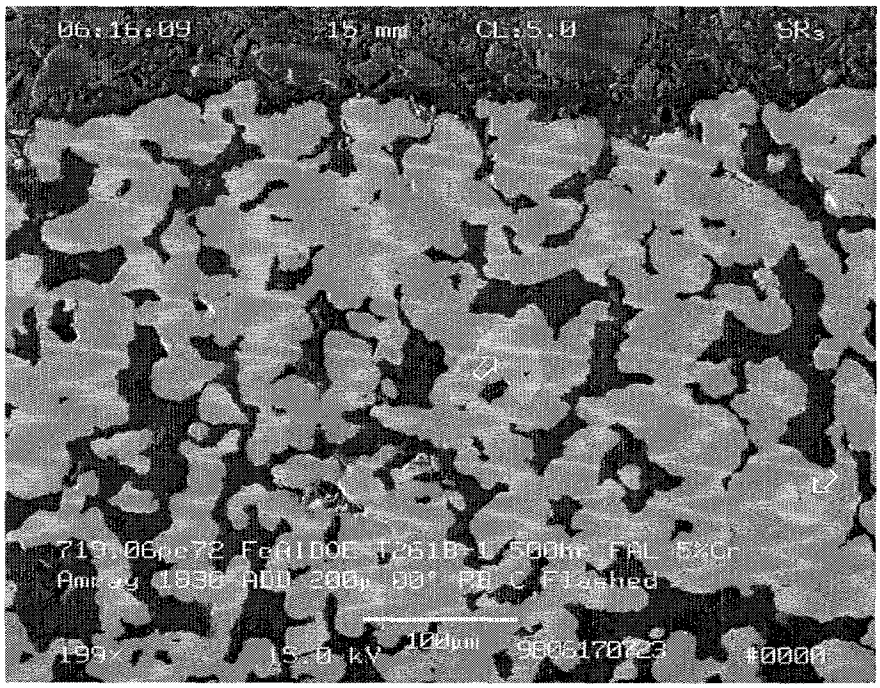

Figure 73: FAL cross-section. Upstream edge shown. Exposed for 500 hours. Lighter areas are from the carbon flashing peeling off (arrows).

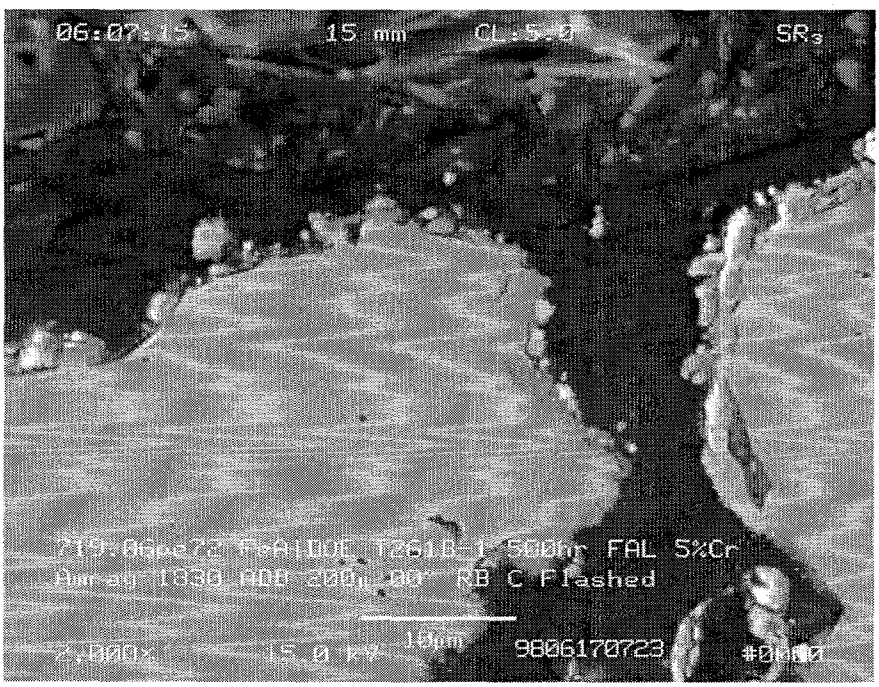

Figure 74: FAL cross-section. Upstream edge shown. Exposed for 500 hours. Some iron sulfide crystals on the upstream surface.

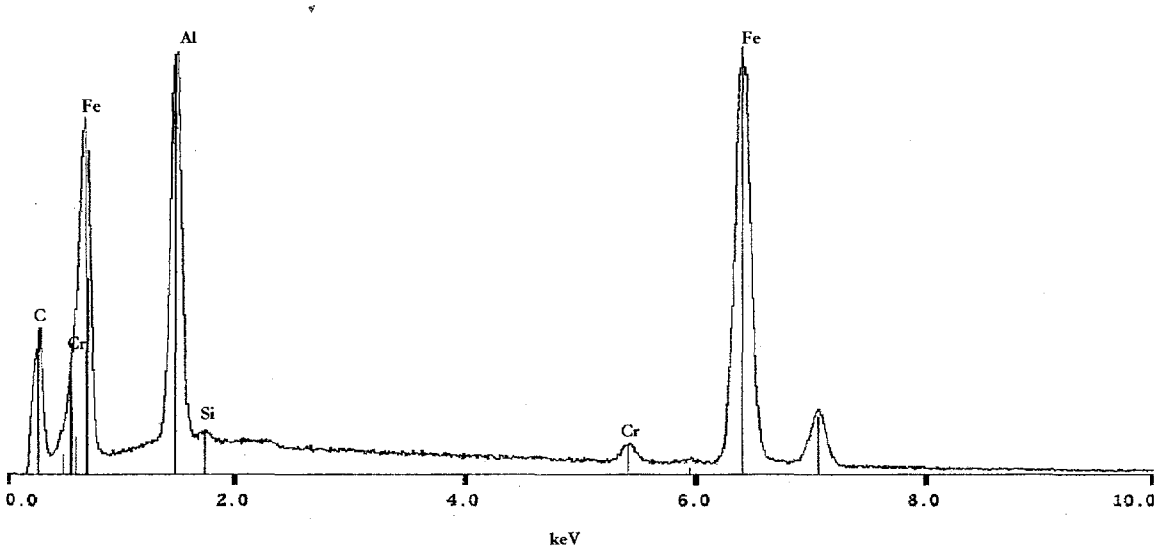

Figure 75: Spectrum of the base metal of Figure 74. Typical iron aluminide signature.

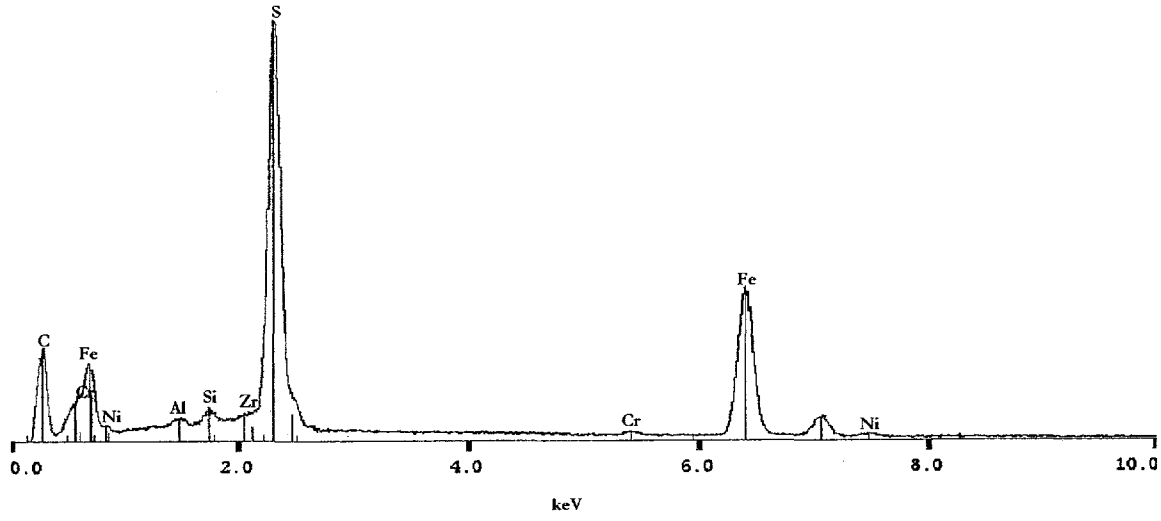

Figure 76: Spectrum of the upstream edge of Figure 74. High sulfur and iron. Strong indication of iron sulfides.

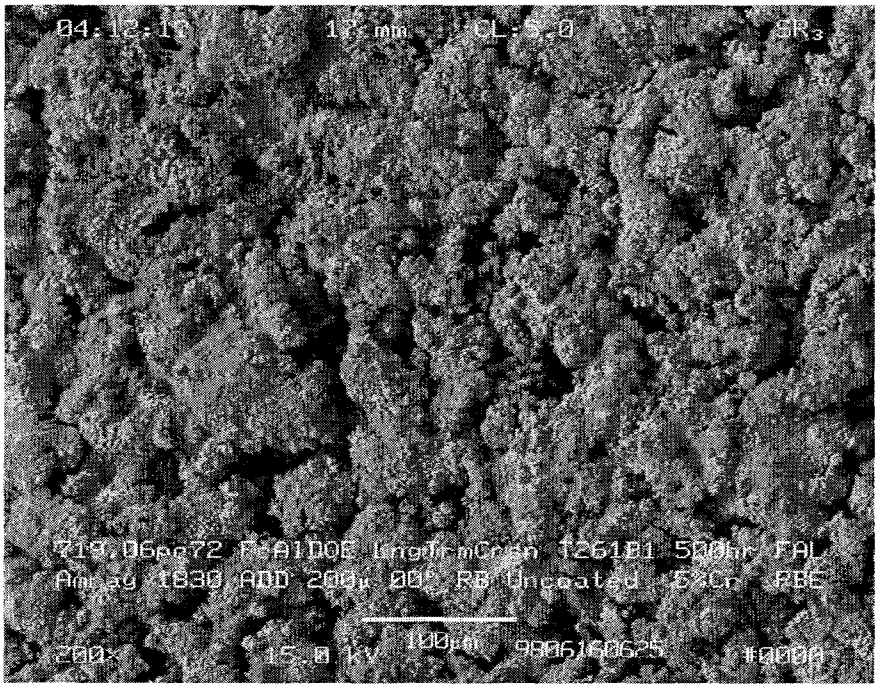

Figure 77: FAL upstream surface. Exposed for 500 hours.

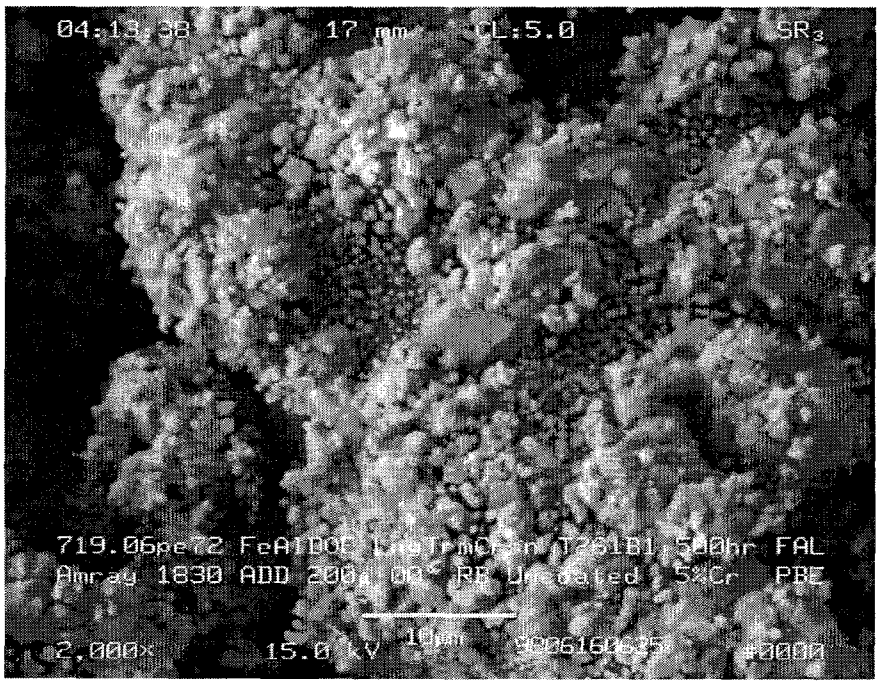

Figure 78: FAL upstream surface. Exposed for 500 hours.

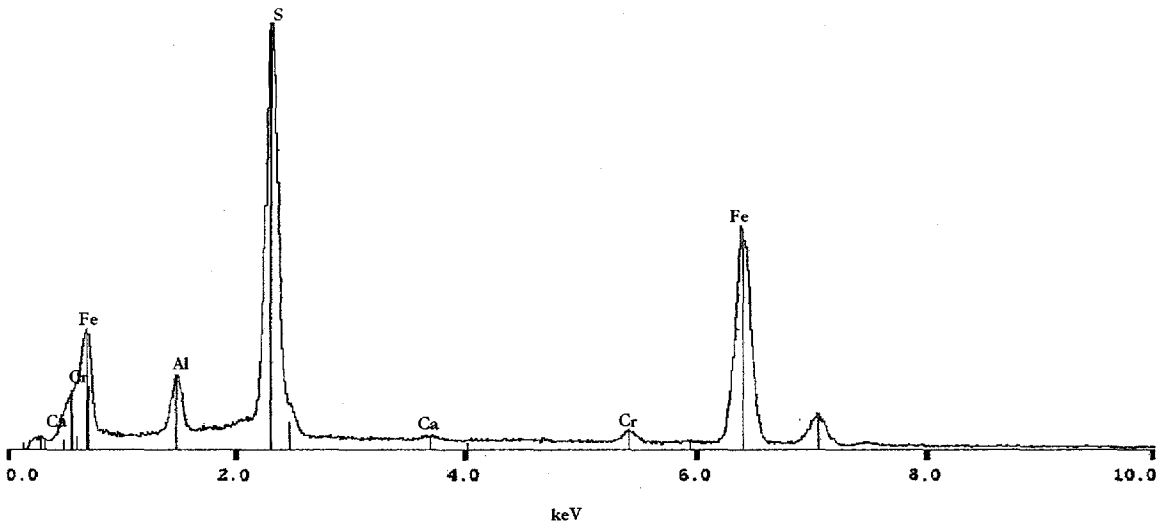

Figure 79: Full screen spectrum of Figure 78. Upstream surface of FAL sample exposed for 500 hours. Sample is probably covered with iron sulfides.

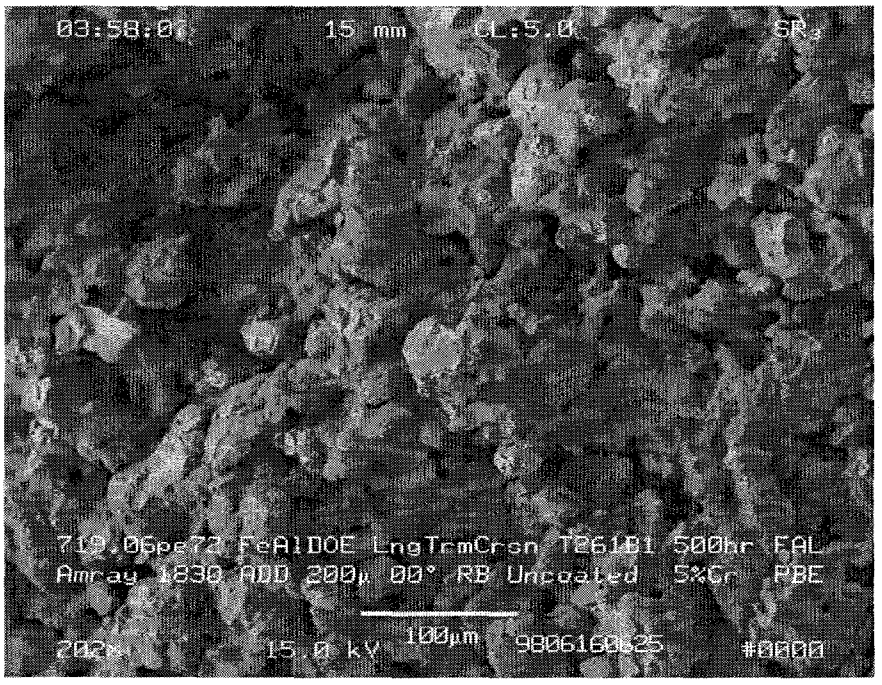

Figure 80: FAL fracture surface. Exposed for 500 hours.

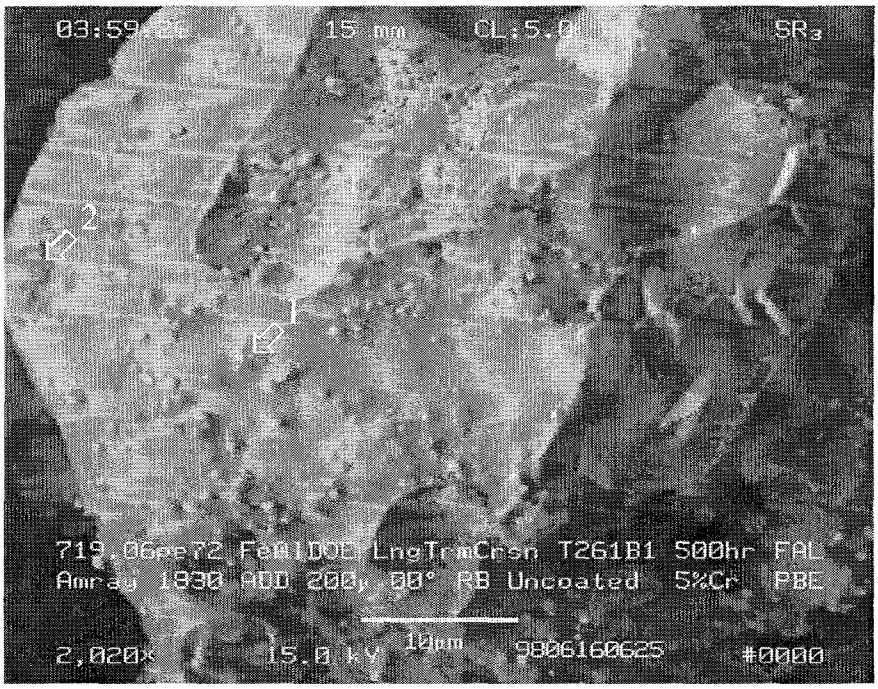

Figure 81: FAL fracture surface. Exposed for 500 hours. Typical unexposed iron aluminide fracture surface with some porosity at sinter bond, zirconium/zirconia nodules on surface. Brittle transgranular fracture. Spectrum of areas (1) and (2) presented in the following figures.

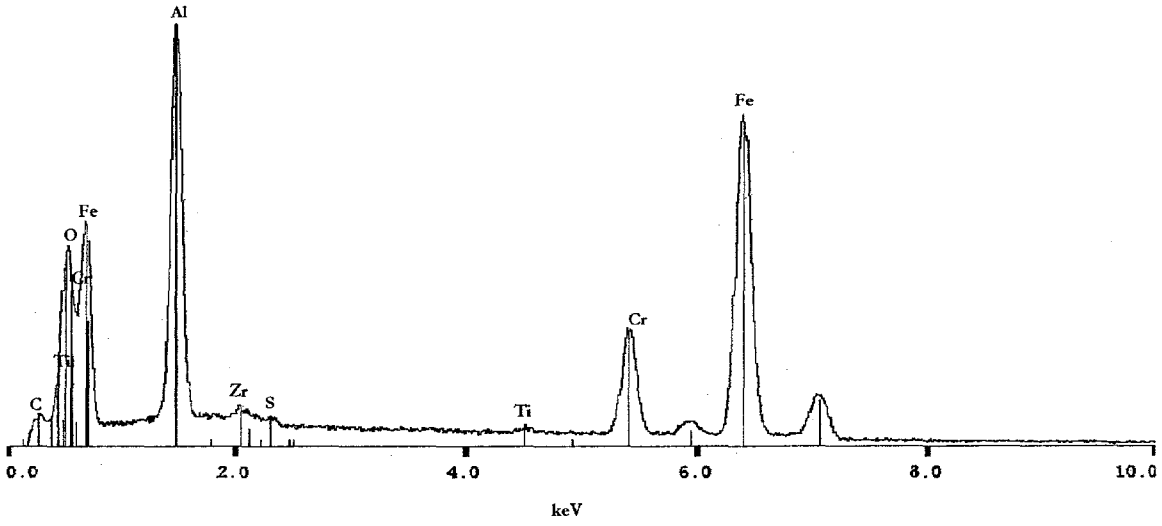

Figure 82: Full screen spectrum of Figure 81. Upstream surface of FAL sample exposed for 500 hours at 2000X. Typical iron aluminide spectrum with a small amount of sulfur.

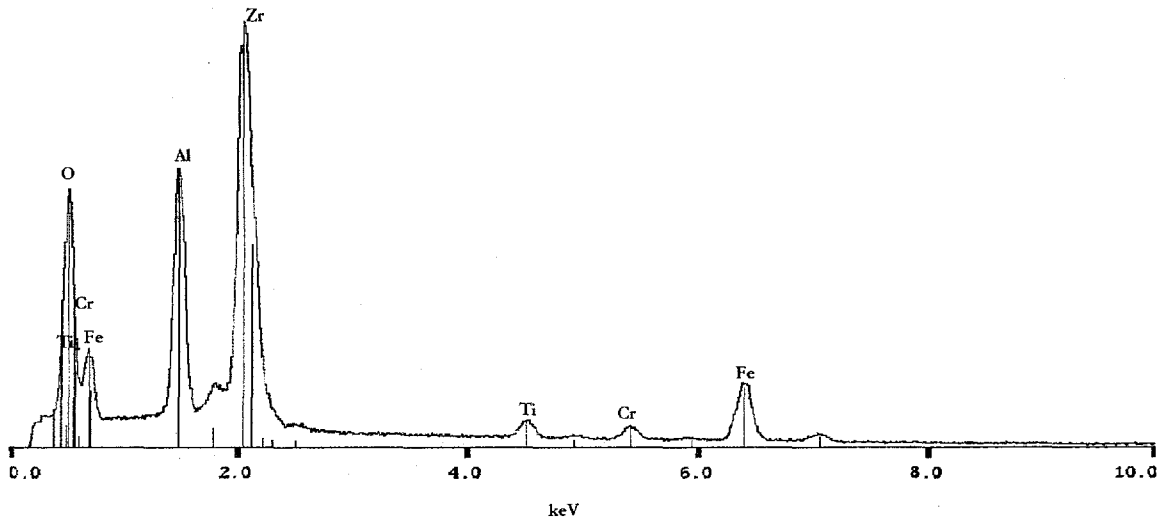

Figure 83: Spot spectrum of bright nodules (1) on Figure 81. Bright nodules are probably zirconium/zirconia.

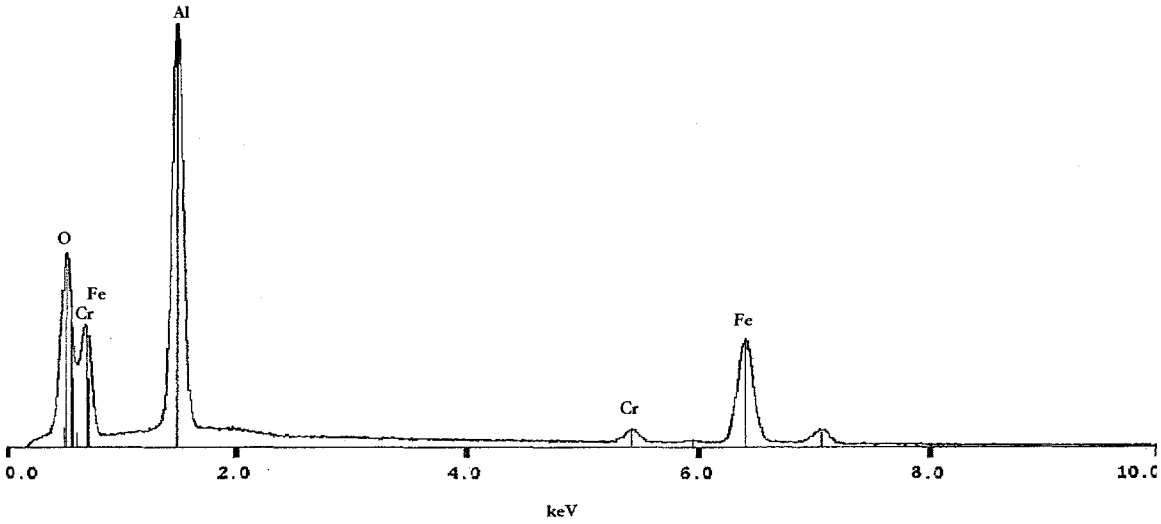

Figure 84: Spot spectrum of dark clusters (2) on Figure 81. The dark clusters are probably alumina crystals.

SEM Images
FAL Sample Exposed for 1000 Hours
(FAL Sample #2)

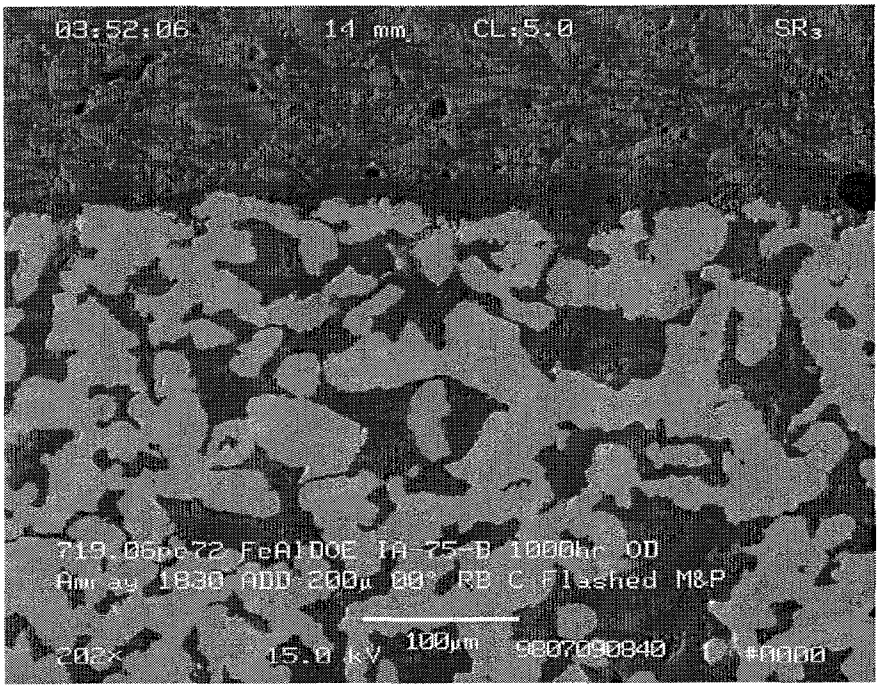

Figure 85: FAL cross-section. Upstream edge shown. Exposed for 1000 hours.

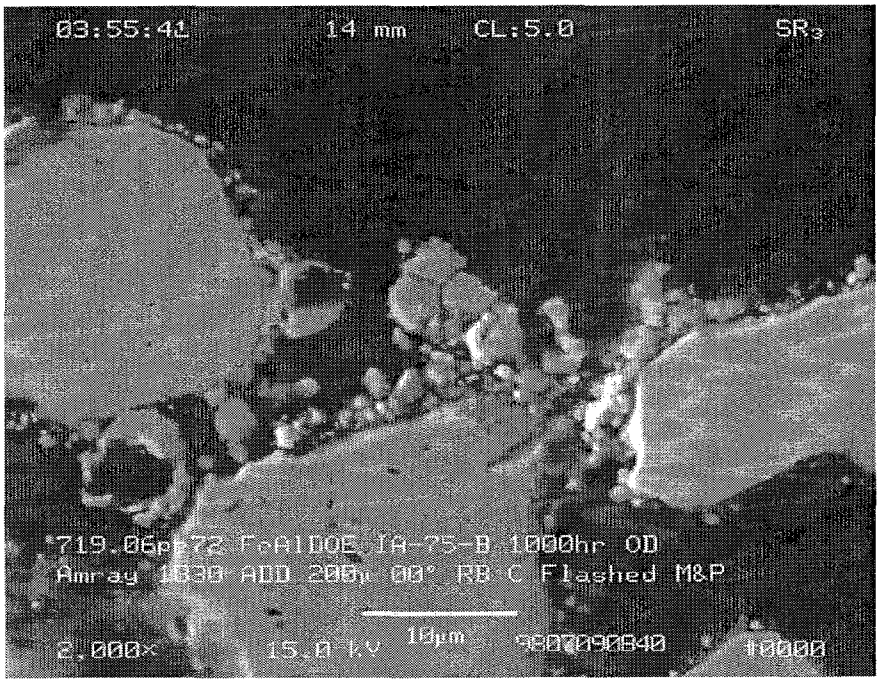

Figure 86: FAL cross-section. Upstream edge shown. Exposed for 1000 hours. Iron sulfide crystals on the upstream surface.

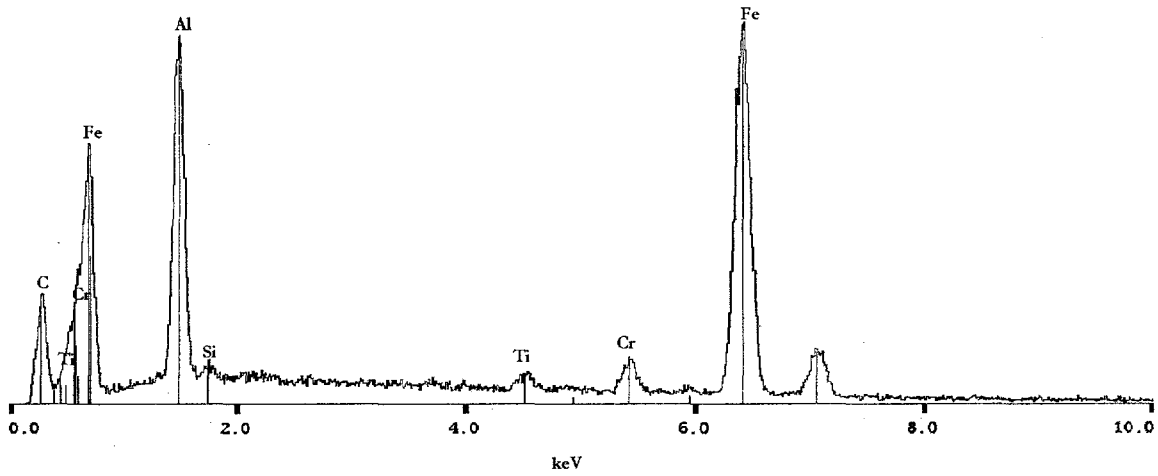

Figure 87: Partial field spectrum of base metal in Figure 86. Typical iron aluminide spectrum.

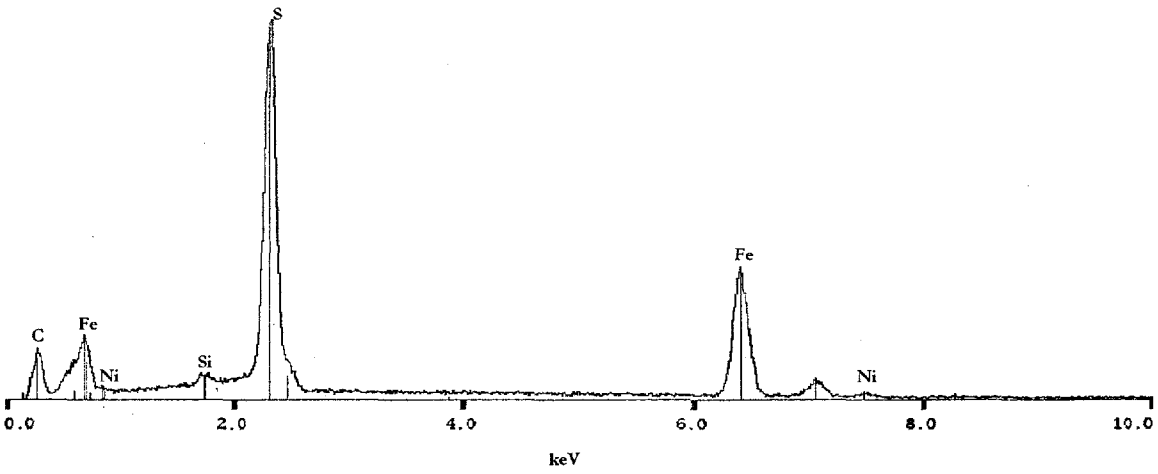

Figure 88: Partial field spectrum of upstream edge in Figure 86. High sulfur and iron. Strong indication of iron sulfides.

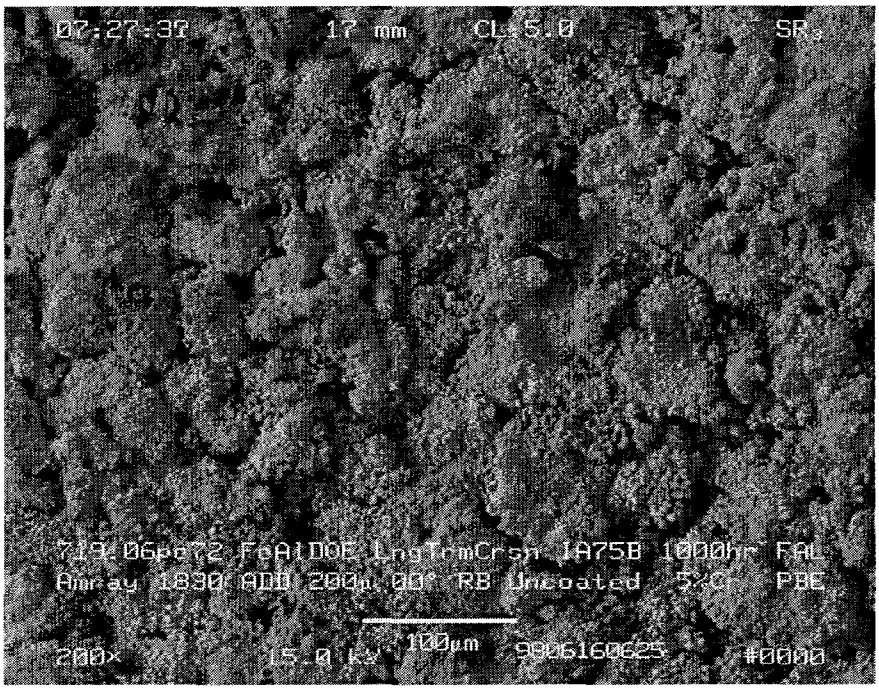

Figure 89: Upstream surface of FAL sample exposed for 1000 hours.

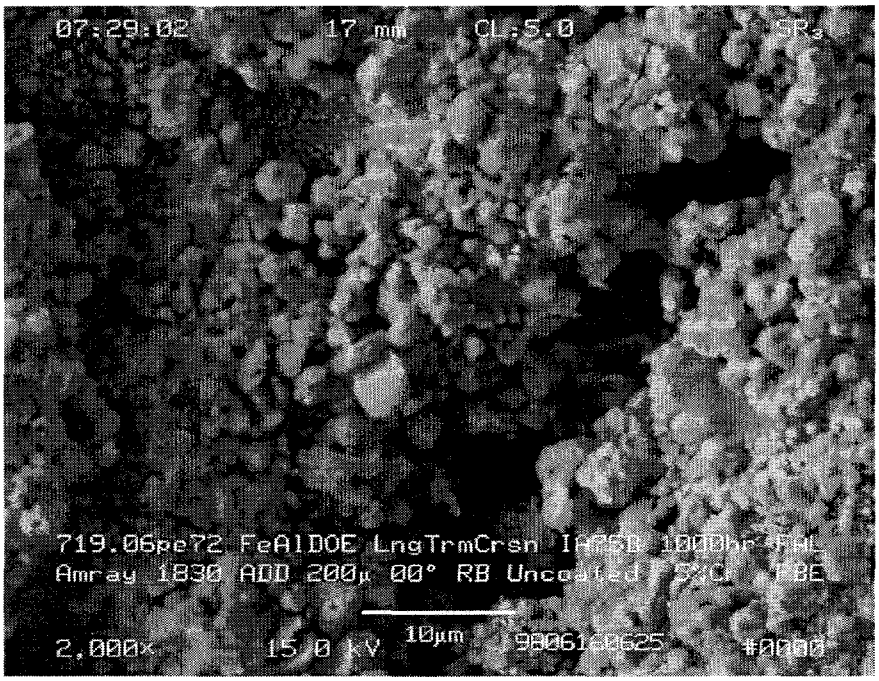

Figure 90: Upstream surface of FAL sample exposed for 1000 hours. Samples surface is covered with iron sulfide crystals.

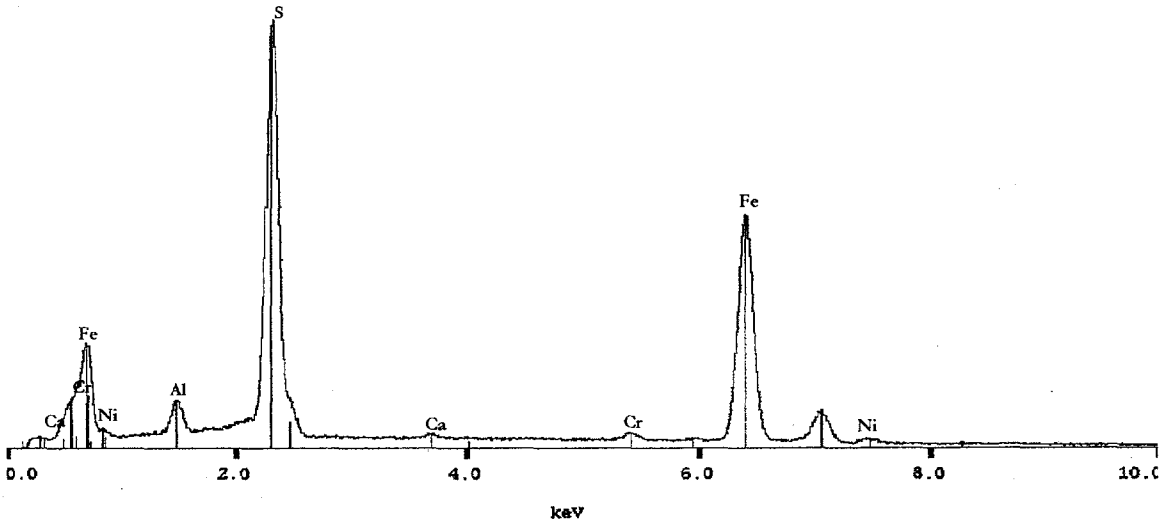

Figure 91: Full screen spectra of Figure 90. The crystals on the upstream surface are most likely iron sulfides.

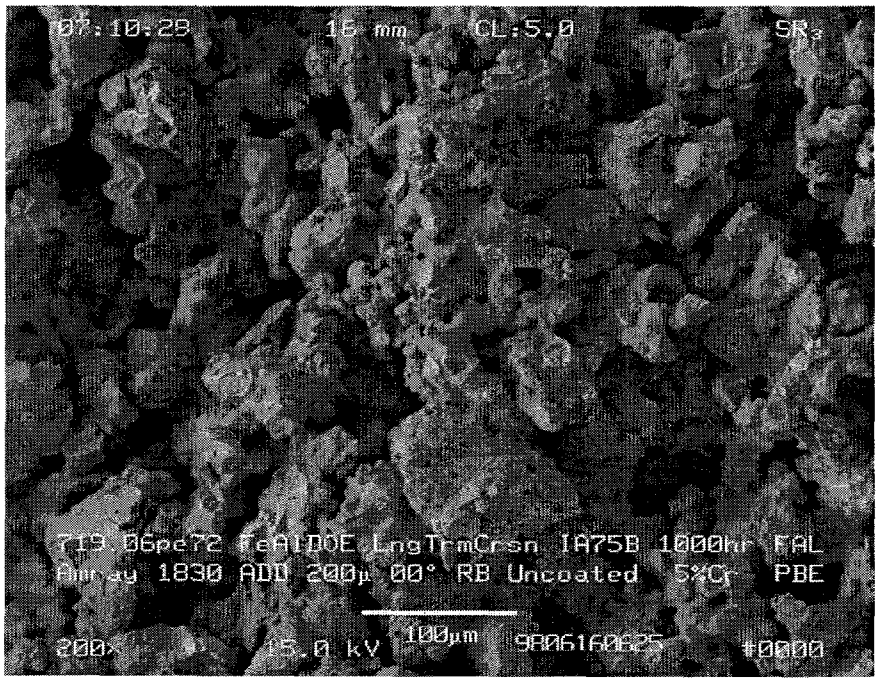

Figure 92: Fracture surface of FAL sample exposed for 1000 hours.

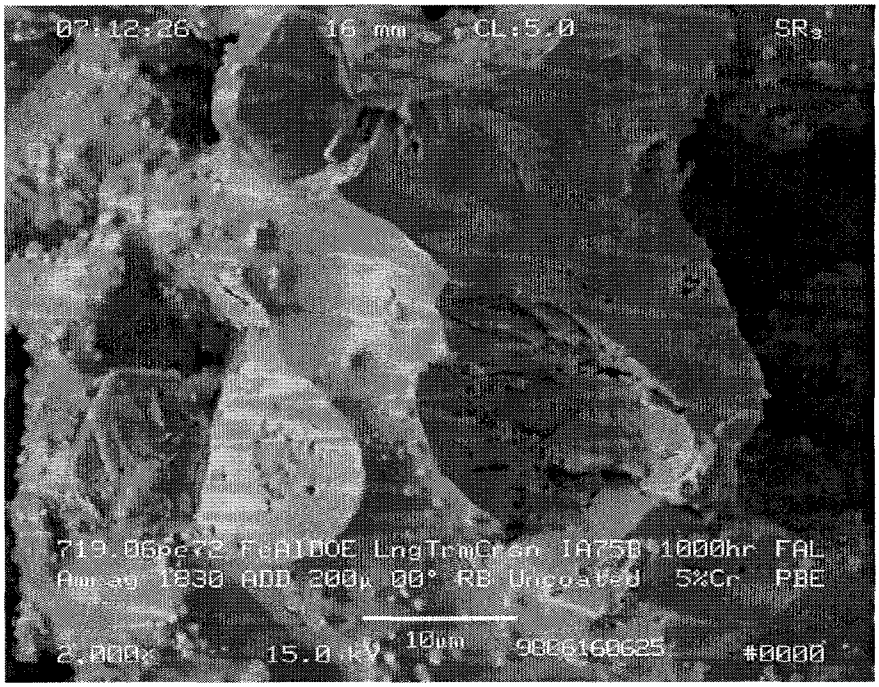

Figure 93: Fracture surface of FAL sample exposed for 1000 hours. Multiple brittle fracture surfaces with some porosity. Zirconium/zirconia nodules on particle surfaces.

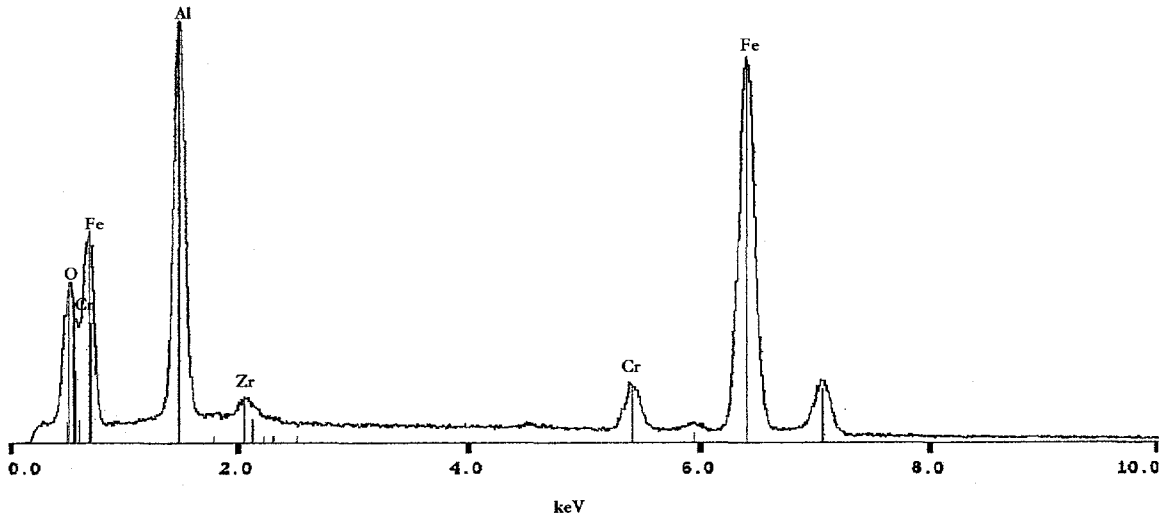

Figure 94: Full screen spectrum of Figure 93. Typical iron aluminide signature.

SEM Images
FAL Sample Exposed for 1500 Hours
(FAL Sample #3)

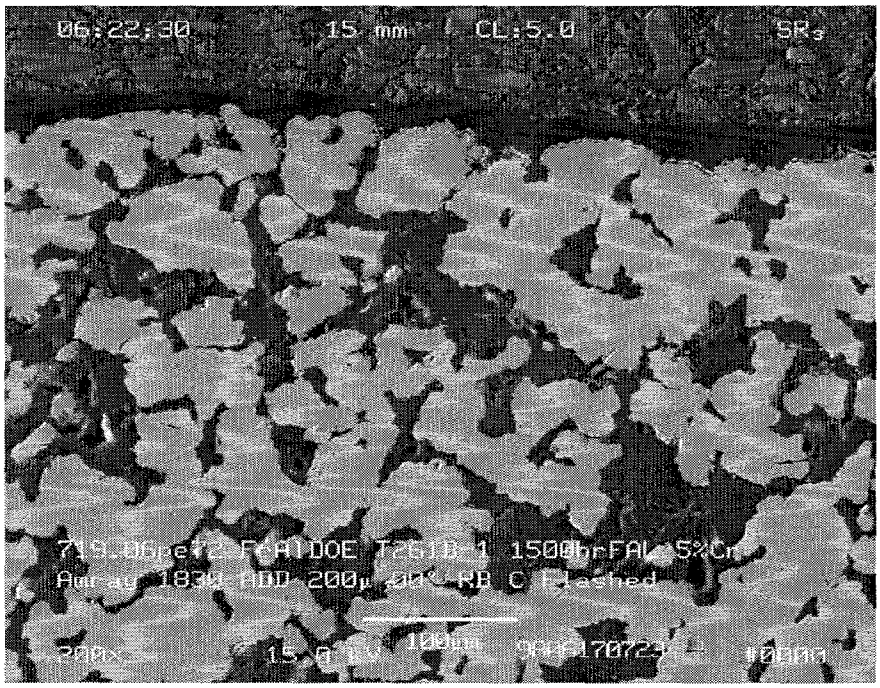

Figure 95: FAL cross-section. Upstream edge shown. Exposed for 1500 hours.

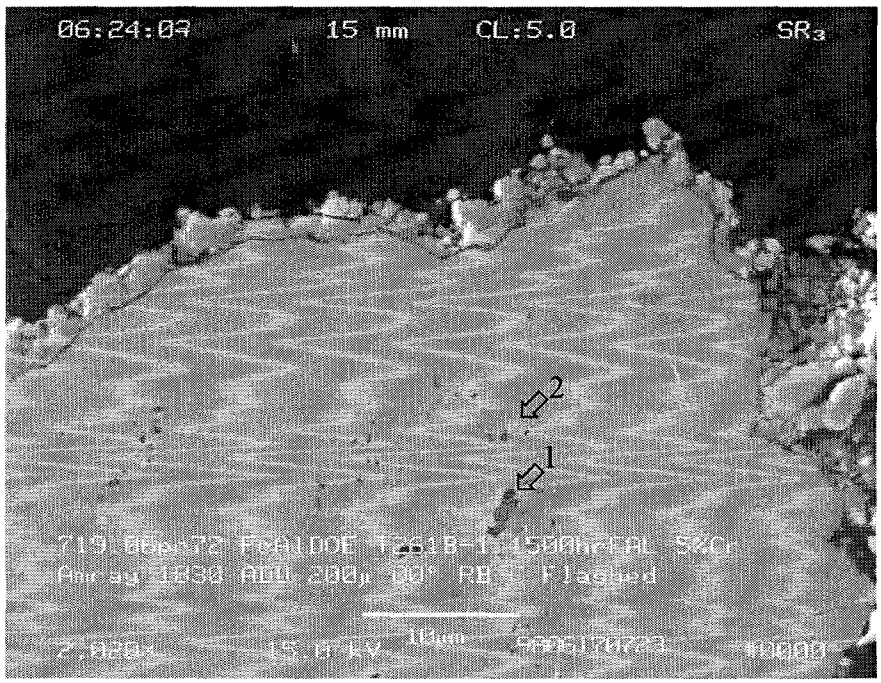

Figure 96: FAL cross-section. Upstream edge shown. Exposed for 1500 hours. Uniform layer of iron sulfide crystals on the upstream surface. Spectrum of areas (1) and (2) presented in the following figures.

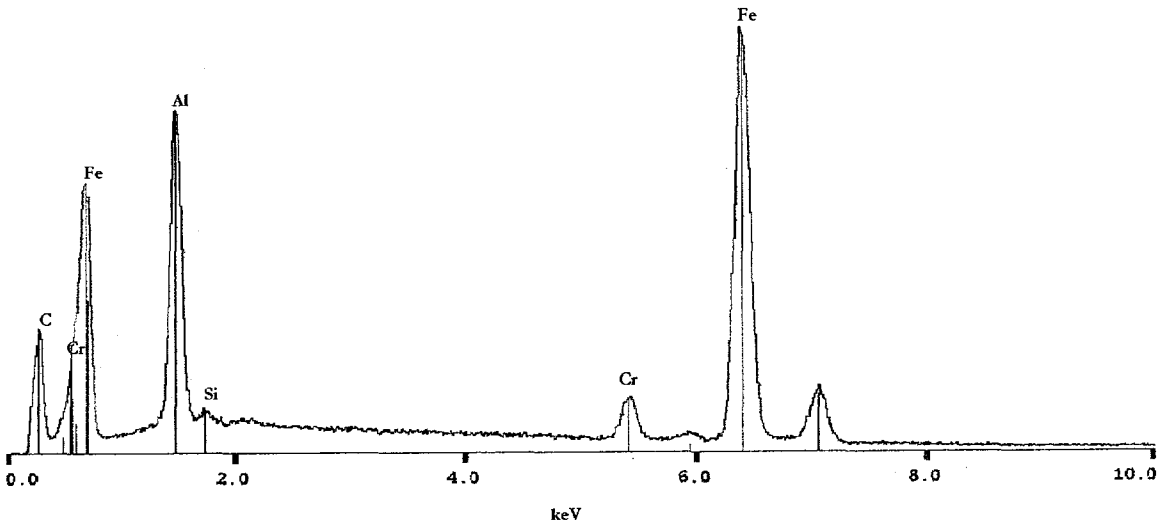

Figure 97: Partial field spectrum of the base metal of Figure 96. Typical iron aluminide signature.

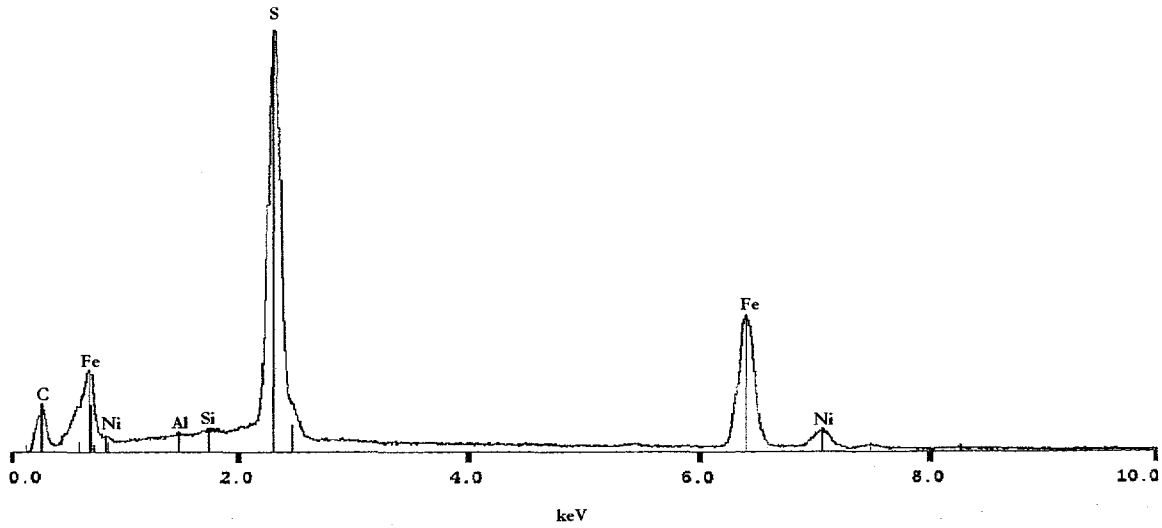

Figure 98: Upstream edge of the filter media of Figure 96. High sulfur and iron. Strong indication of iron sulfides.

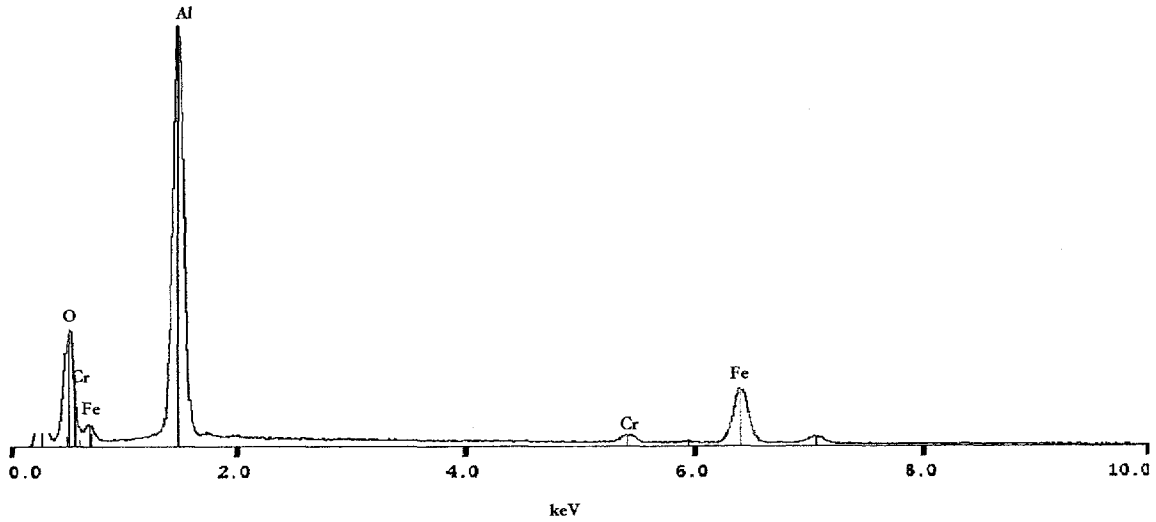

Figure 99: Spot spectrum of dark inclusions (1) in Figure 96. Alumina inclusion from the water atomization of the powdered metal.

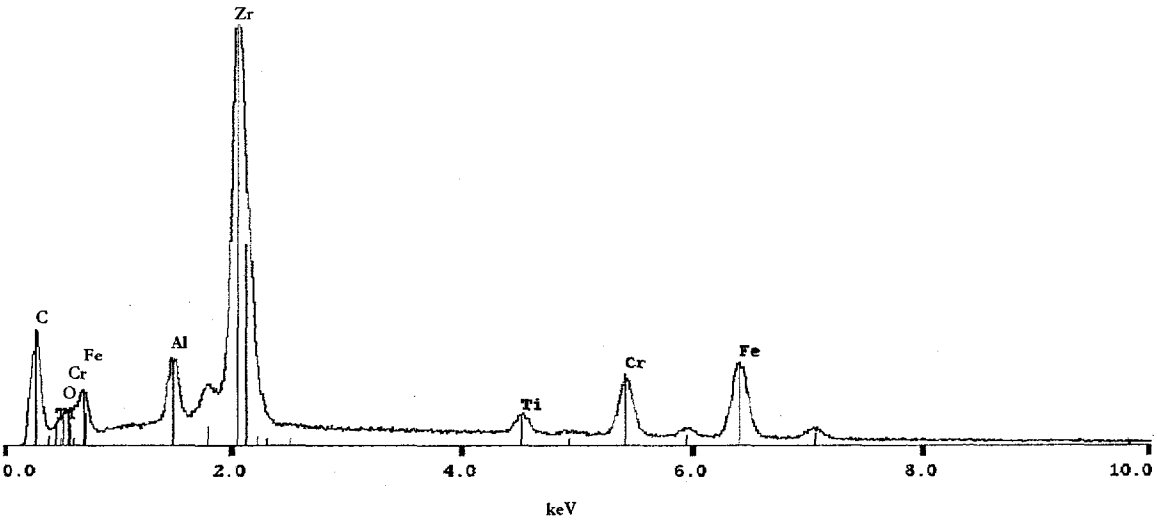

Figure 100: Spot spectrum of light inclusion (2) of Figure 96. Appears to be a zirconia inclusion.

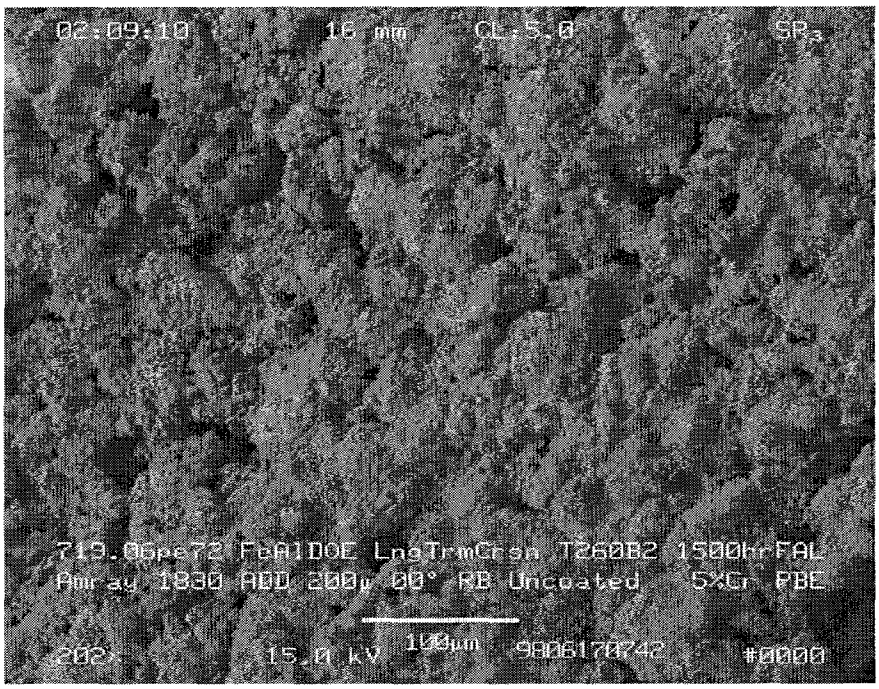

Figure 101: FAL upstream surface. Exposed for 1500 hours. Covered in a layer of crystals.

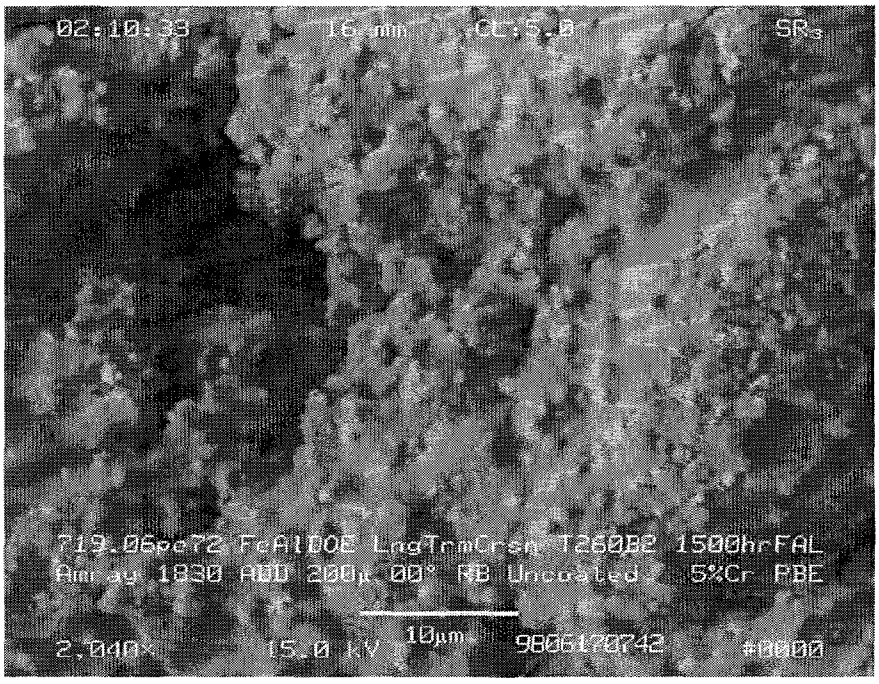

Figure 102: FAL upstream surface. Exposed for 1500 hours.

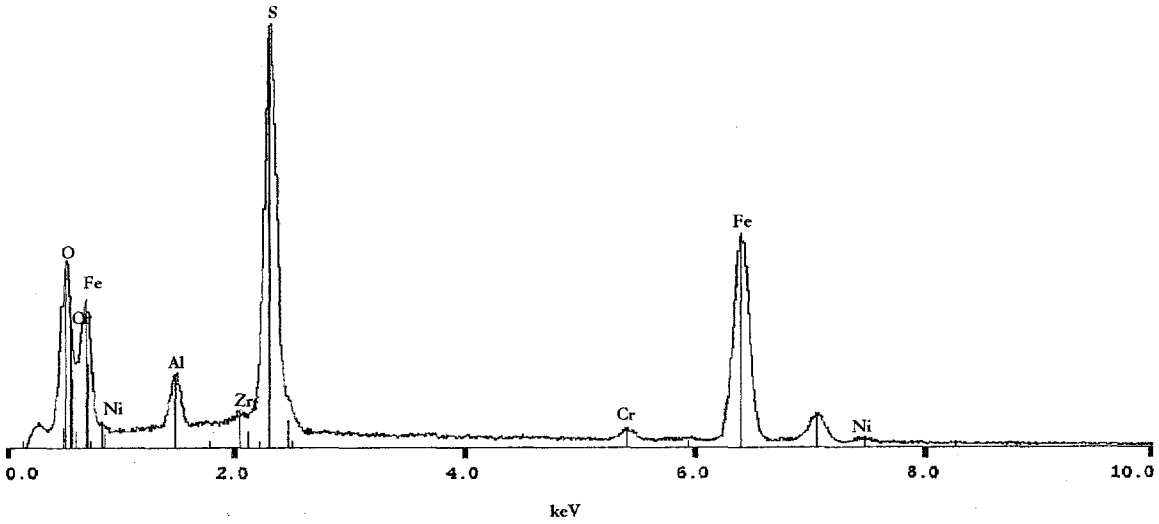

Figure 103: Full screen spectrum of Figure 102. Upstream surface of FAL sample exposed for 1,500 hours at 2000X. High sulfur and iron. Indication of iron sulfides.

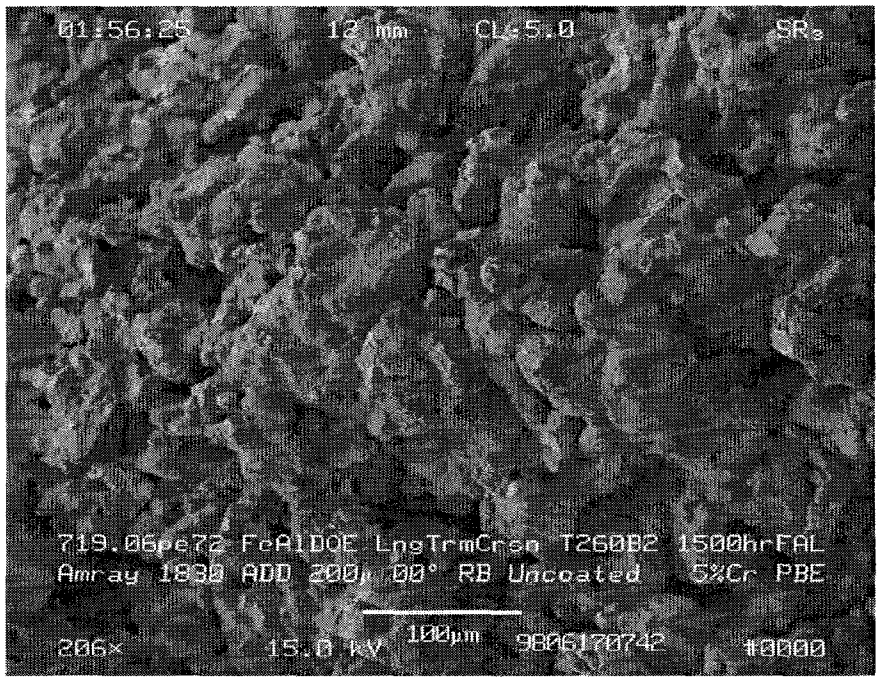

Figure 104: FAL fracture surface. Exposed for 1500 hours.

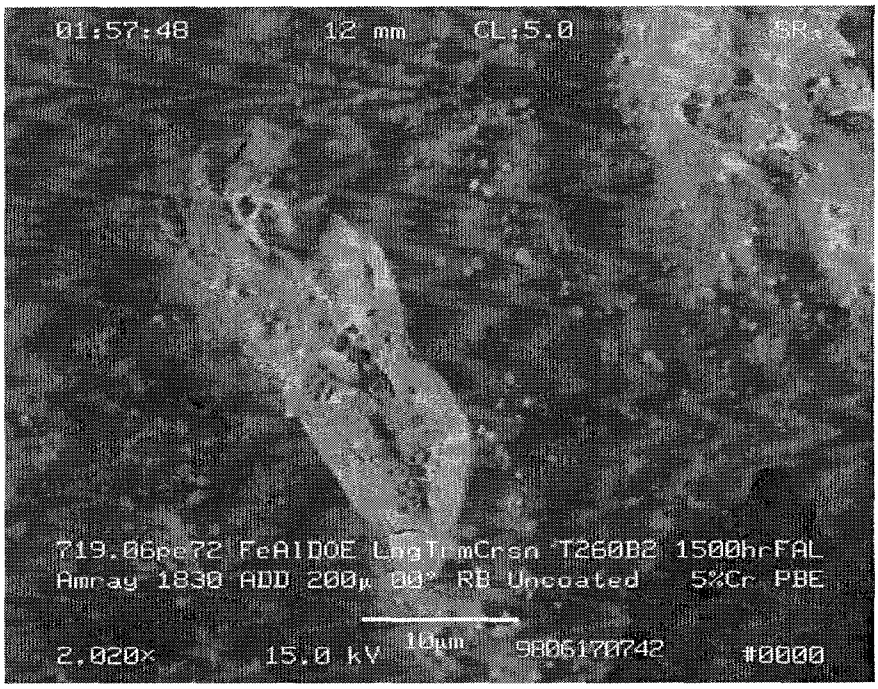

Figure 105: FAL fracture surface. Exposed for 1500 hours.

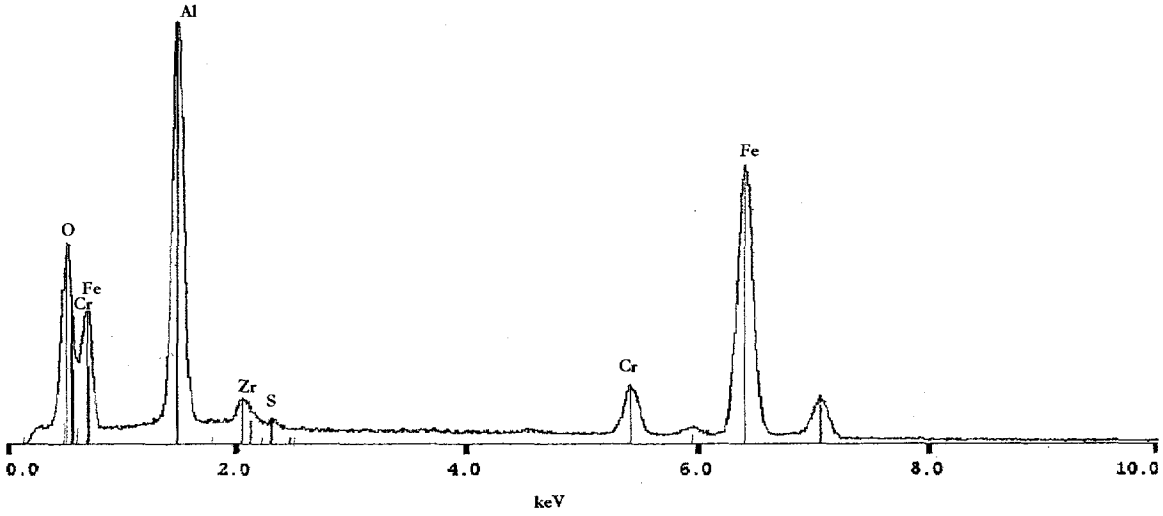

Figure 106: Full screen spectrum of Figure 105. **Fracture surface of FAL sample exposed for 1,500 hours at 2000X.**

APPENDIX IIV

RAW NON-DESTRUCTIVE DATA

Table 4: Mass (grams) of Iron Aluminide Filters (Raw Data)

Time (hours)	FAS sample #1	FAS sample #3	FAS sample #2	FAL sample #1	FAL sample #3	FAL sample #2
0	139.0473	139.3366	137.9868	143.7777	143.5160	141.4333
31	139.0808	139.3725		144.0290	143.5578	
62	139.1097	139.4025		144.0505	143.5758	
125	139.1352	139.4298		144.0723	143.6066	
250	139.2219	139.5179		144.1511	143.6911	
500	139.4493	139.7652		144.3741	143.9308	
750		139.7903	138.1535		143.9650	141.5879
1000		139.7869	138.2042		143.9349	141.6463
1250		139.8484	138.3036		144.0039	141.7374
1500		139.8864	138.3593		144.0649	141.8279
Cleaned	139.2686	139.7667		144.2034	143.9258	

Table 5: Pressure Drop (in. H_2O) of Iron Aluminide Filters (Raw Data)

Time (hours)	FAS sample #1	FAS sample #3	FAS sample #2	FAL sample #1	FAL sample #3	FAL sample #2
0	15.6	15.3	19.6	15.8	15.6	19.2
31	16.5	16.1		18.0	16.4	
62	16.1	15.9		17.5	16.0	
125	17.1	17.0		18.7	17.2	
250	18.2	18.0		19.9	18.2	
500	25.4	25.3		27.8	25.6	
750		26.3	21.7		26.7	21.6
1000		26.9	22.2		26.7	22.0
1250		30.7	25.6		31.4	25.2
1500		32.9	29.1		33.5	26.7
Cleaned	21.6	20.7	20.1	23.1	21.1	20.7

Table 6: First Bubble Point (in. H_2O) of Iron Aluminide Filters (Raw Data)

Time (hours)	FAS sample #1	FAS sample #3	FAS sample #2	FAL sample #1	FAL sample #3	FAL sample #2
0	20.5	20.5	20.5	22.5	22.0	22.5
31	18.9	19.0		23.0	24.1	
62	19.2	19.1		22.1	24.0	
125	20.8	18.1		23.6	17.8	
250	20.8	19.1		19.2	20.8	
500	12.4	21.5		20.0	25.3	
750		20.6	15.1		19.9	20.3
1000		22.7	21.8		24.5	19.9
1250		21.0	29.1		8.0	3.3
1500		8.9	4.8		21.2	7.9
Cleaned	19.5	17.7	18.2	23.0	21.7	5.0

Table 7: Tenth Bubble Point (in. H_2O) of Iron Aluminide Filters (Raw Data)

Time (hours)	FAS sample #1	FAS sample #3	FAS sample #2	FAL sample #1	FAL sample #3	FAL sample #2
0	21.9	21.0	21.9	23.6	22.9	22.8
31	22.9	20.6		23.1	24.5	
62	19.8	20.6		23.7	24.5	
125	21.9	19.2		24.4	23.8	
250	21.5	20.8		23.1	23.0	
500	24.7	21.9		26.0	26.0	
750		23.0	20.9		26.0	22.5
1000		23.0	22.6		25.8	22.0
1250		21.0	23.6		24.3	22.4
1500		21.7	20.5		25.7	20.8
Cleaned	23.1	19.6	19.2	25.2	23.4	22.0

Table 8: Open Bubble Point (in. H_2O) of Iron Aluminide Filter (Raw Data)

Time (hours)	FAS sample #1	FAS sample #3	FAS sample #2	FAL sample #1	FAL sample #3	FAL sample #2
0	25.3	25.0	28.3	25.9	26.5	27.5
31	24.2	26.9		30.0	31.0	
62	26.3	26.5		30.8	29.5	
125	26.1	25.9		29.2	29.0	
250	25.8	26.6		29.6	30.2	
500	32.7	34.7		36.2	36.0	
750		36.2	29.2		35.0	30.1
1000		35.3	29.0		34.9	29.3
1250		33.0	29.1		36.0	30.0
1500		39.0	33.0		35.0	35.0
Cleaned	28.5	26.6	25.4	33.0	30.2	26.1