Analysis Report on Metal Samples from the 1947 UFO Crash on the Plains of San Augustine, New Mexico

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Background Information

Six metal samples were obtained from Mr. Chuck Wade, who stated that he and a digging crew excavated the samples from the desert floor on the plains of San Augustine, New Mexico. This area was reportedly the site of the July 2, 1947 crash of a small, extraterrestrial craft.

Some of Mr. Wade's materials have been analyzed previously by light and scanning electron microscopy, no other analytical results from these materials have been published, to date.

Analytical Procedure

Six metal samples were given to the author for analysis. Digital images of the samples were taken, using a dissecting microscope, at 8X-40X magnification. The samples were then imaged using another light microscope, capable of much higher magnification (100X-400X).

Flakes of each sample were then removed by cutting with a surgical scalpel and mounted on aluminum posts for scanning electron microscopy (SEM) imaging and energy dispersive X-ray (EDX) elemental analysis, to determine the presence and distribution of elements in each sample.

SEM magnifications from <100X-15,000X were employed. EDX area scan, elemental mapping, and point-and-shoot analyses were also employed.

Small pieces of each sample (~10 mg) each were then cut off, dissolved in nitric acid, and analyzed by inductively coupled plasma mass spectrometry (ICP-MS), to determine the concentrations of the major component elements in each sample, along with the trace element abundances. The ICP-MS raw data was then used to determine the relative abundances of isotopes of three elements in one of the samples.

The samples were also exposed to the field of a Neodymium-Iron-Boron (NIB) magnet to determine whether they are ferromagnetic. A pendulum with a small lead weight attached was also passed over the samples as a simple test for gravitational, or magnetic, fields emitted from the samples.

Analysis Results

Appearance and Physical Characteristics of Sample

The six samples (W-1-6) were all shards of a silvery sheet metal, which resembled sheet aluminum. Two of the samples had a tan, or greenish-tan, outer coating which appeared to be a protective layer.

All of the samples, with the exceptions of W-2 and W-6, had many ridges in the material, and had a crumpled appearance.

All of the samples were able to be bent by hand, with sample W-6 being the only exception. This sample was thicker than the others, and its increased thickness may have accounted for its greater strength.

Light Microscopy

Light micrographs, at magnification from 8X-400X are shown below in Figures 1-6. All samples appear to be a sheet metal which resembles aluminum. All of the samples are very thin (~0.05 mm), except for sample #6, which is approximately 1.0 mm thick.

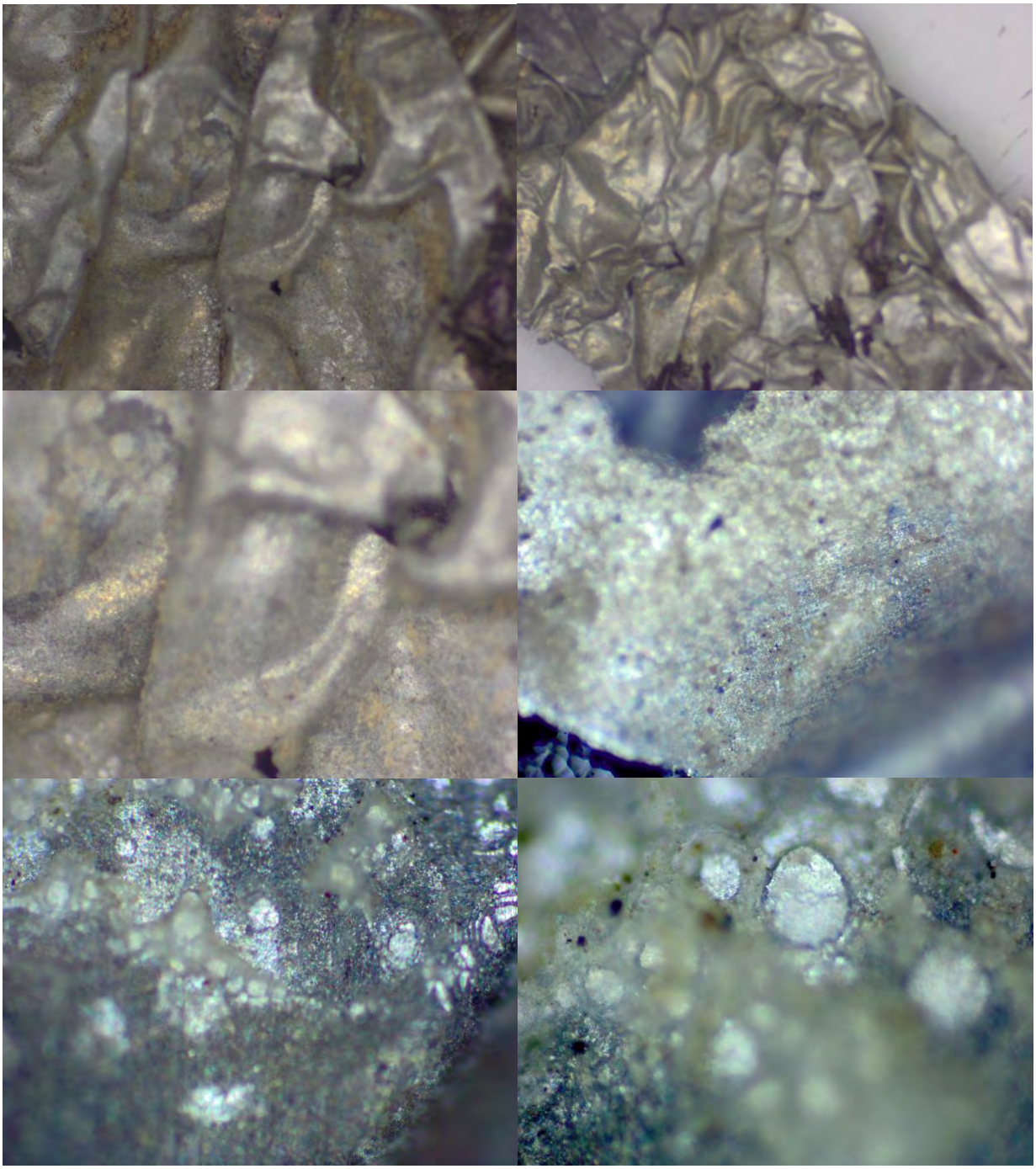


Figure 1-Sample W-1-Image (a)-8X, Image (b)-20X, Image (c)-40X, Image (d)-100X, Image (e)-200X, Image (f)-400X

Samples #2, #3, and #6 had thin surface coatings, which appeared to be a few microns in thickness. These coatings later proved to be of different composition than the bulk metals.

These coatings could be removed by scraping with a knife, or other metallic instrument, but were bonded fairly well to the metal (Figure 2). Samples W-2 and W-6 appeared to have the thickest coatings.

Figure 2-Sample W-2-Image (a)-40X, Image (b)-40X-Showing Coating Removed, Image (c)-100X, Image (d)-200X, Image (e)-400X, Image (f)-100X

The coating on sample W-2 was tan in color, the coating on sample W-3 was brown, and the coating on sample W-6 was greenish.

The metallic portions of samples W-1 and W-3 appeared to have round structures, or crystals, embedded in the metal, which were several microns in average diameter. Sample W-6, had a layered

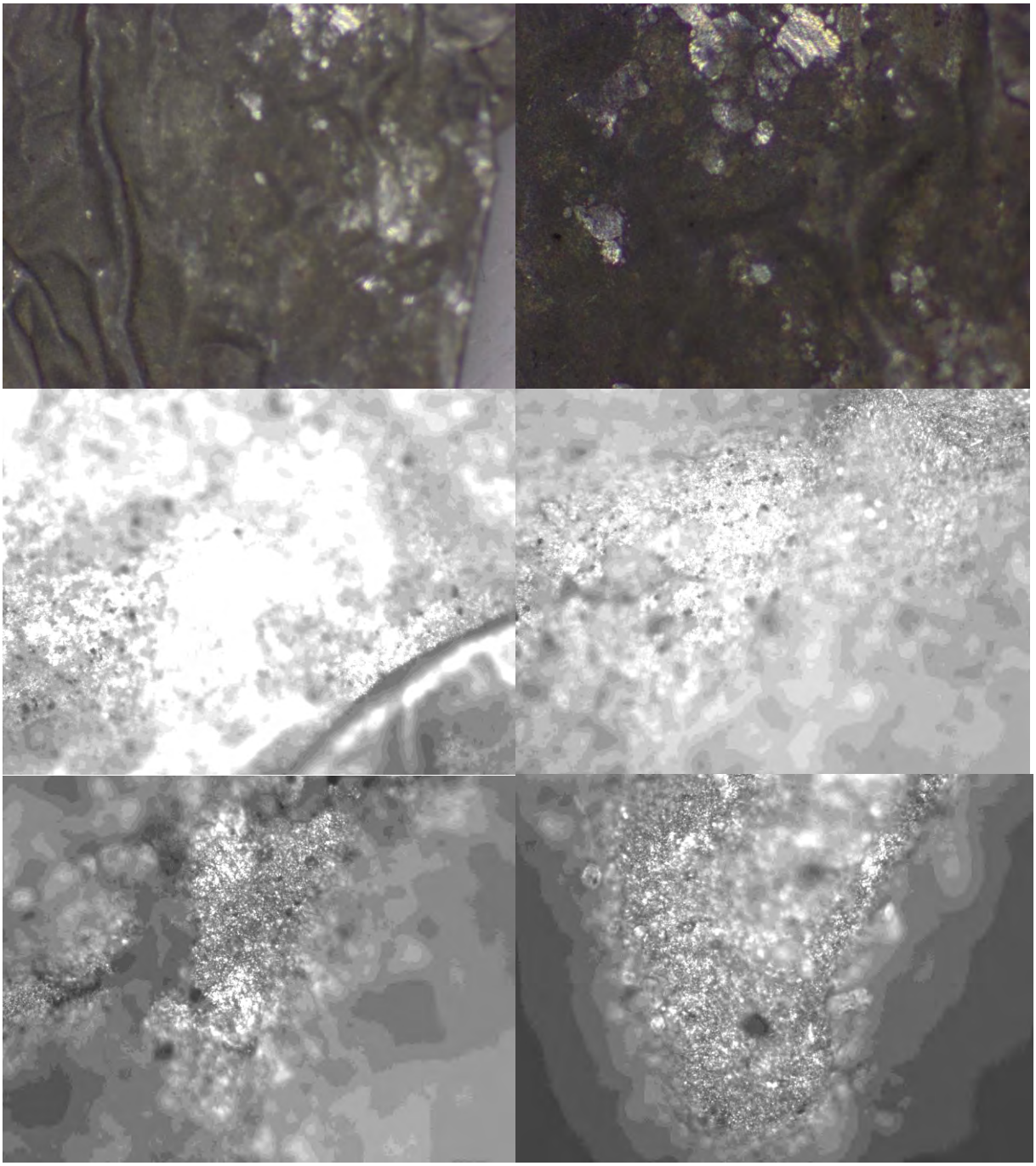


Figure 3-Sample W-3- Image (a)-20X, Image (b)-40X, Image (c)-100X, Image (d)-200X, Image (e)-400X, Image (f)-400X

structure, composed of what appeared to be columnar metallic crystals. The metallic portions of the remaining samples appeared to be very uniform, under light microscopy.

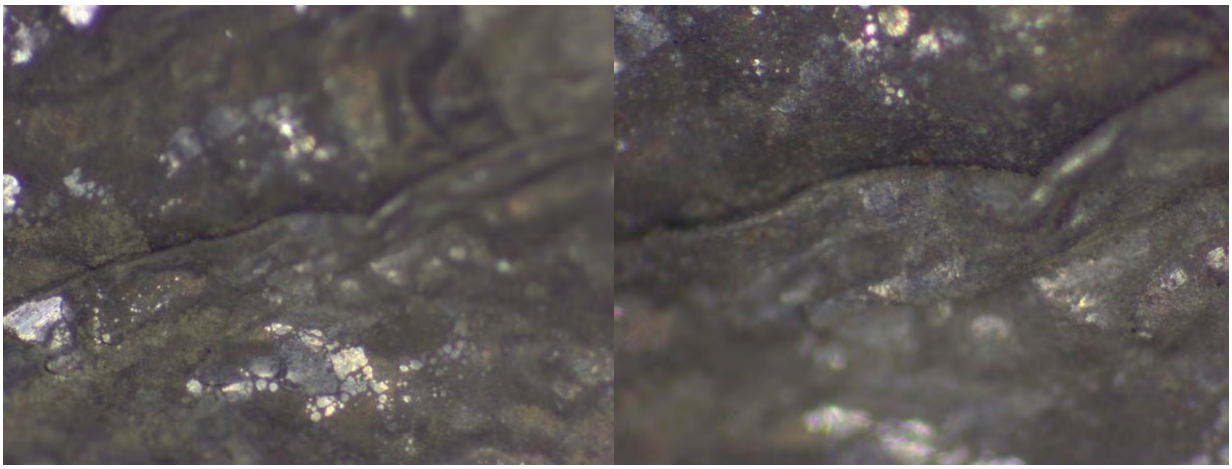


Figure 4-Sample W-4- Image (a)-20X, Image (b)-40X, Image

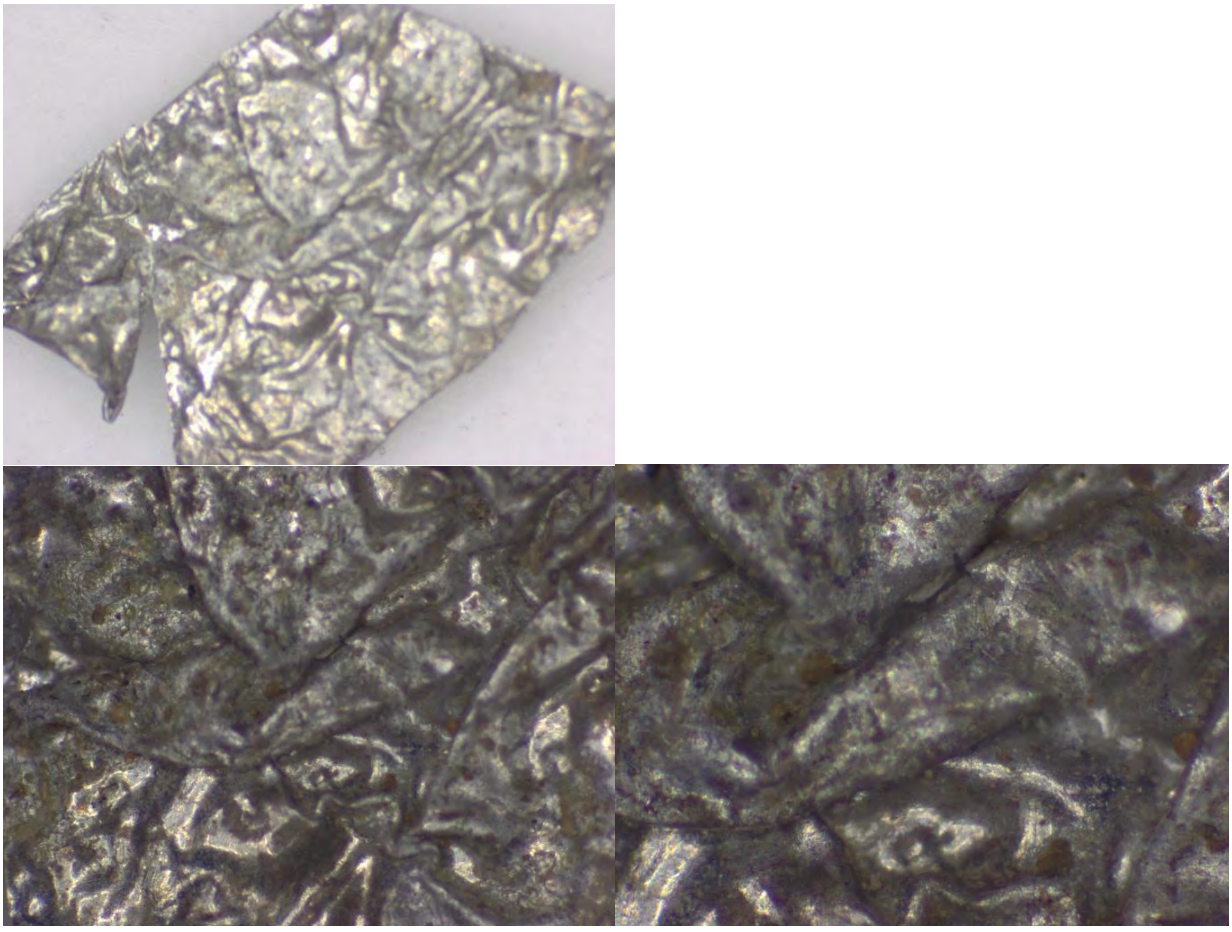


Figure 5-Sample W-5- Image (a)-10X, Image (b)-20X, Image (c)-40X

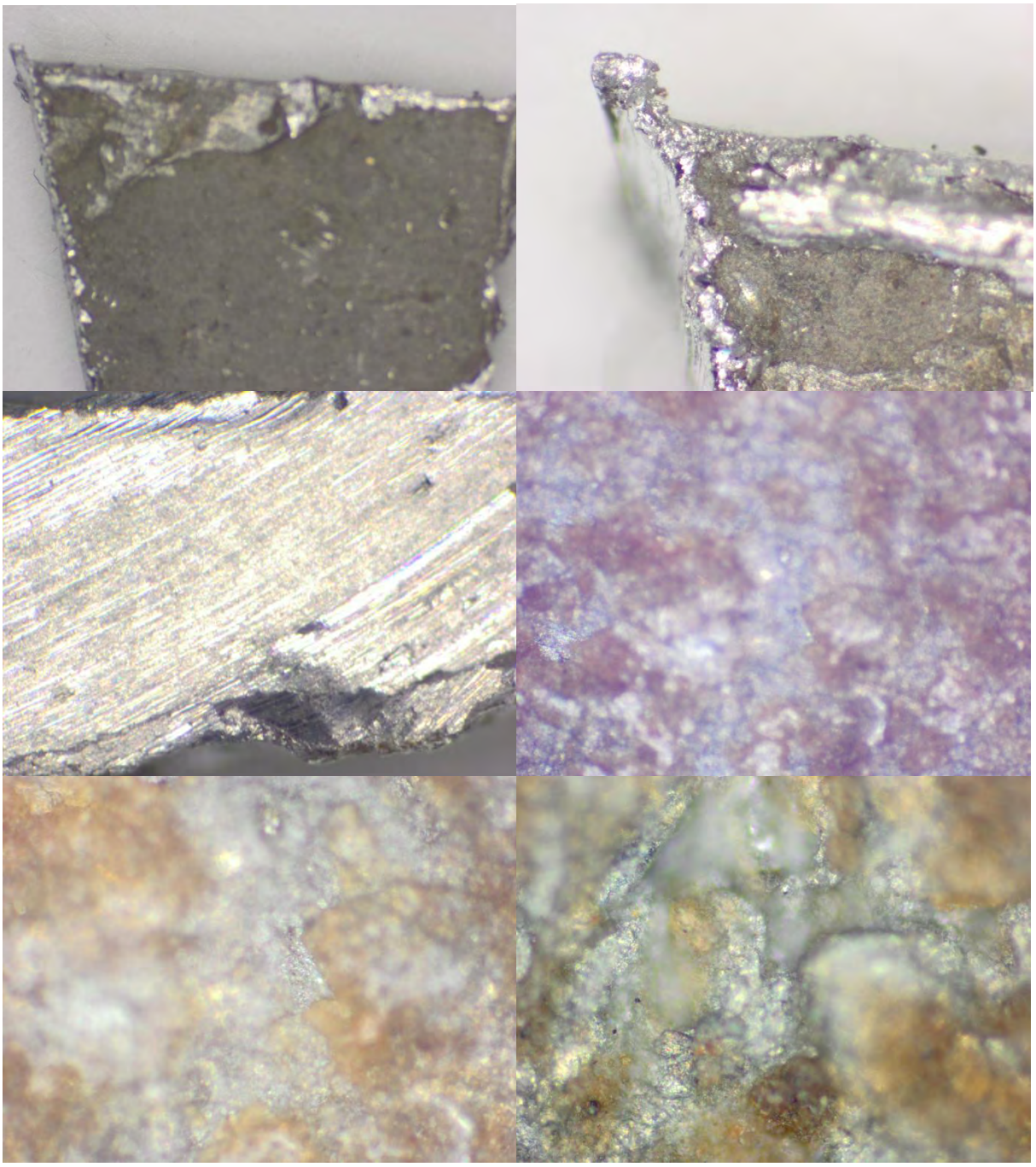


Figure 6-Sample W-6- Image (a)-10X, Image (b)-40X, Image (c)-40X, Image-Edge (d)-100X, Image-Coating (e)-200X-Coating, Image (f)-400X-Coating

SEM Imaging

Scanning electron microscope (SEM) images were taken of all of the samples, at magnification ranging from 25X to 15,000X. Higher magnifications were not used because a problem was encountered in

focusing on these samples at higher magnification. The focusing problem was of sufficient magnitude to preclude the use of magnifications greater than 15,000X.

SEM images of all samples, at various magnifications, are shown in Figures 7-12.

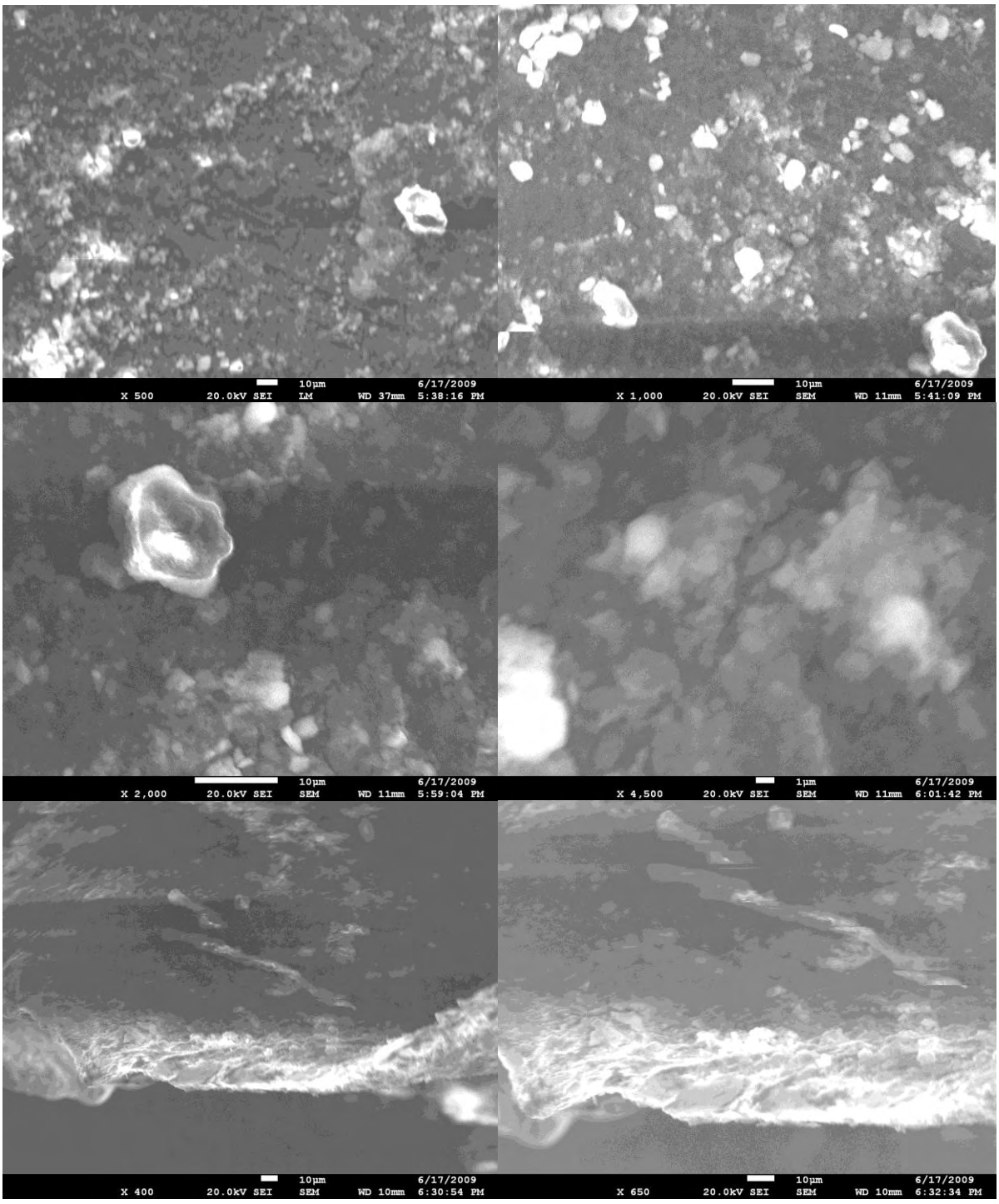


Figure 7-Sample W-1- Image (a)-500X, Image (b)-1000X, Image (c)-2000X, Image (d)-4500X, Image (e)-Edge-400X, Image (f)-Edge-450X

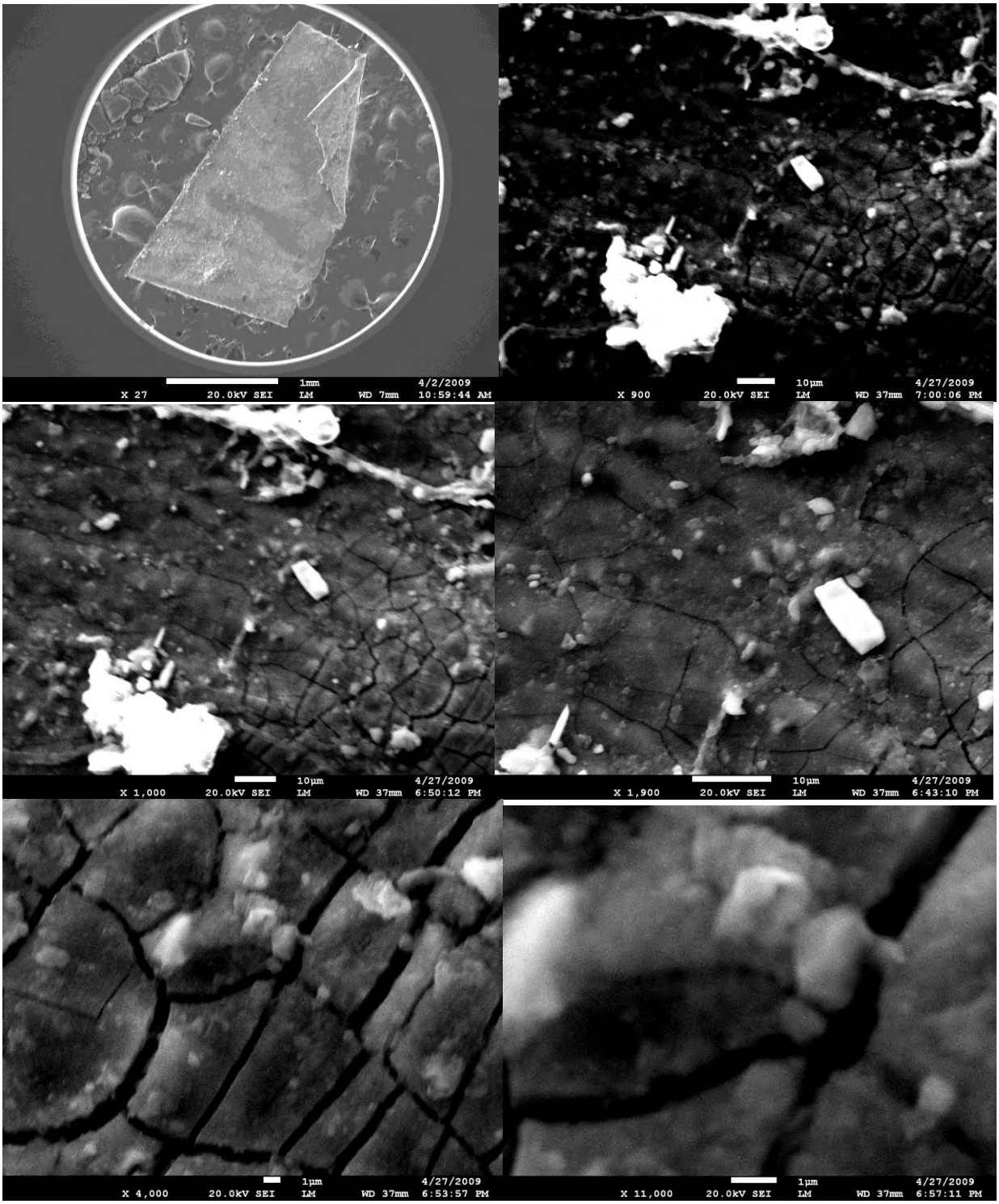


Figure 8-Sample W-2- Image (a)-27X, Image (b)-900X, Image (c)-1000X, Image (d)-1900X, Image (e)-Edge-4000X, Image (f)-11000X

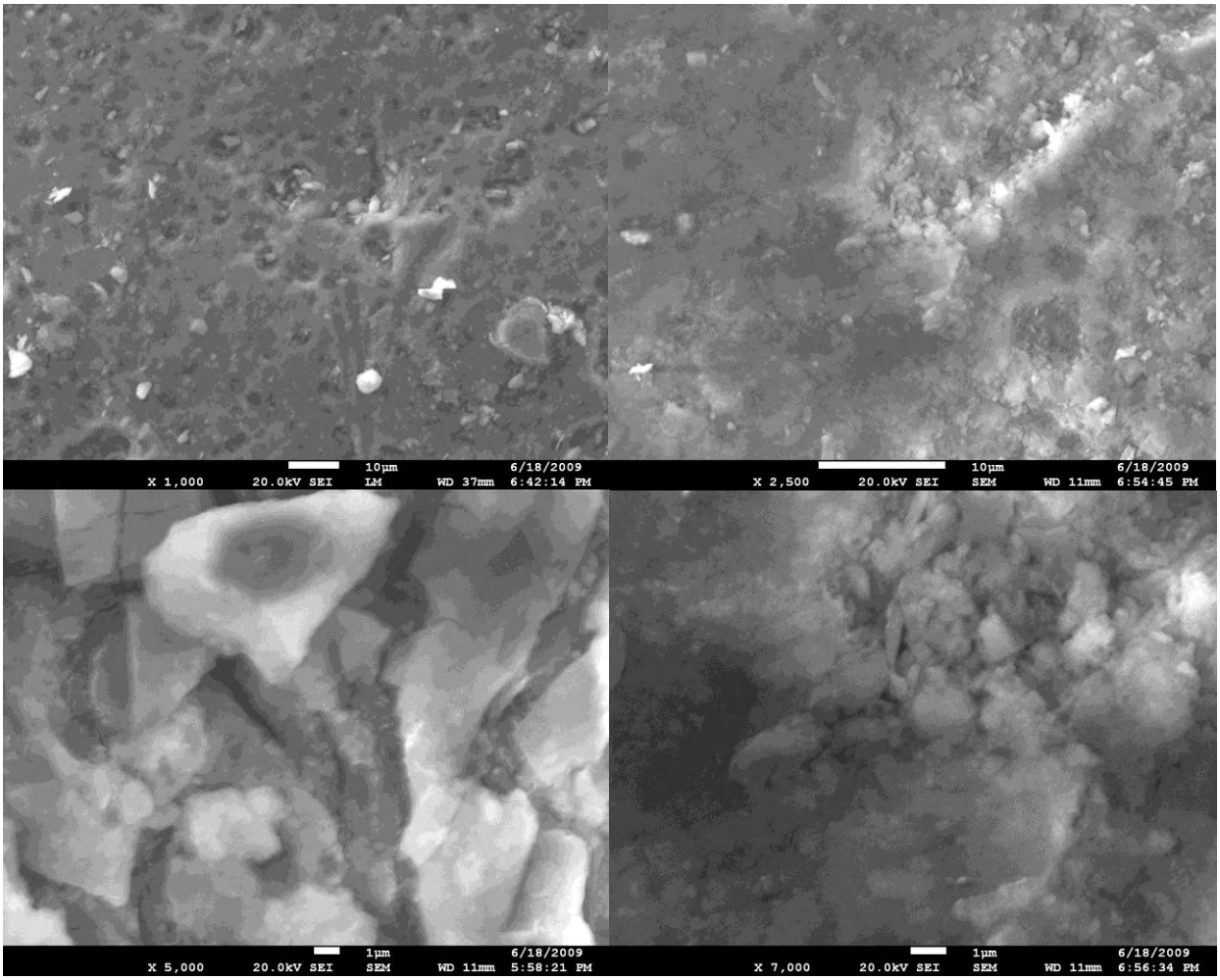


Figure 9-Sample W-3- Image (a)-1000X, Image (b)-2500X, Image (c)-5000X, Image (d)-7000X

The SEM images showed ceramic-like crystals (Figures 7-11), cracks (Figures 8 and 10), and pits (Figure 11) in the outer coatings of the coated samples, and metallic crystals in the metallic portions of the samples, especially sample W-6, which appeared to have a preferred direction to the metallic structure (Figure 12).

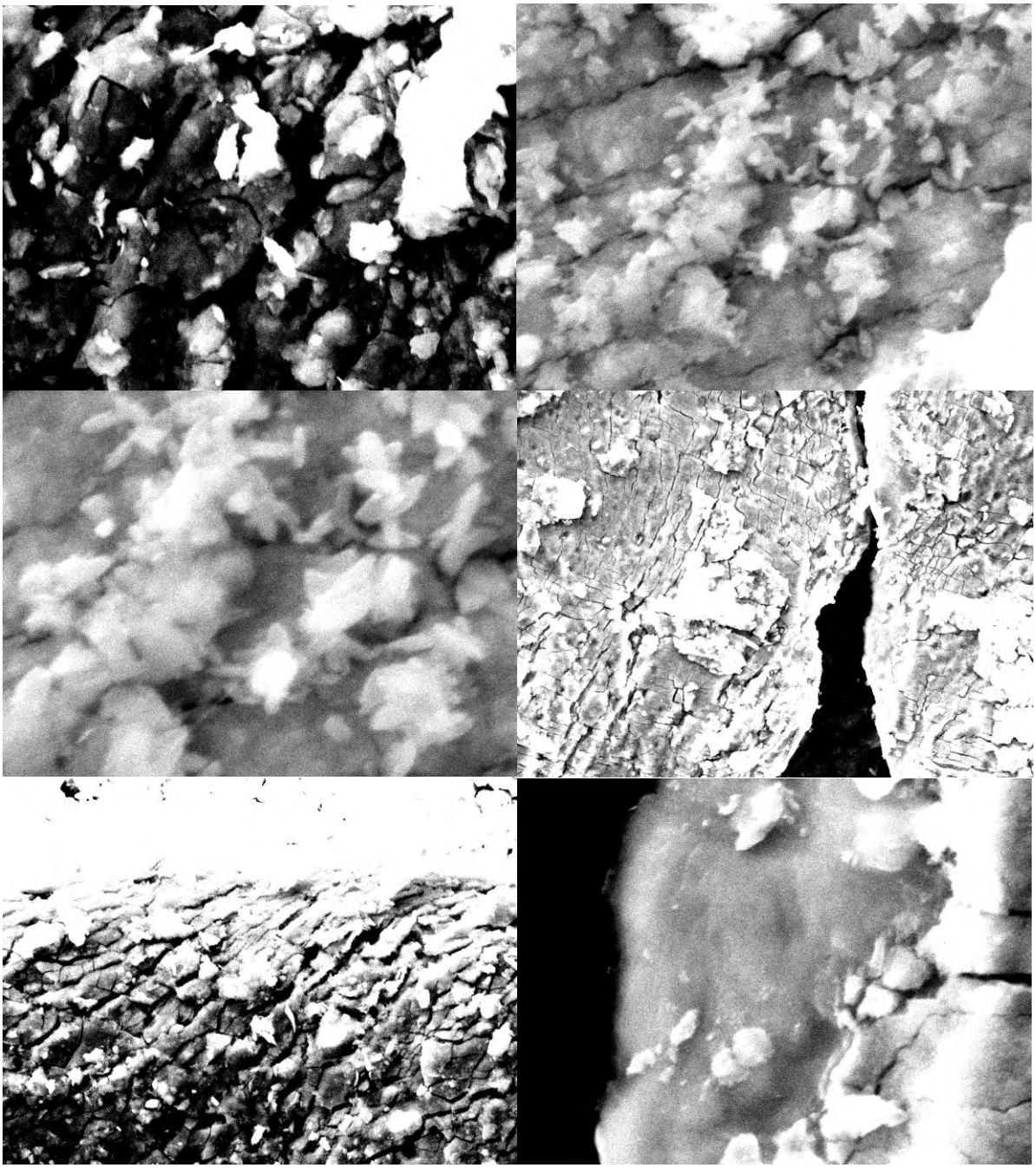


Figure 10-Sample W-4- Image (a)-1500X, Image (b)-2000X, Image (c)-X, Image (d)-X, Image (e)-Edge-X, Image (f)-X

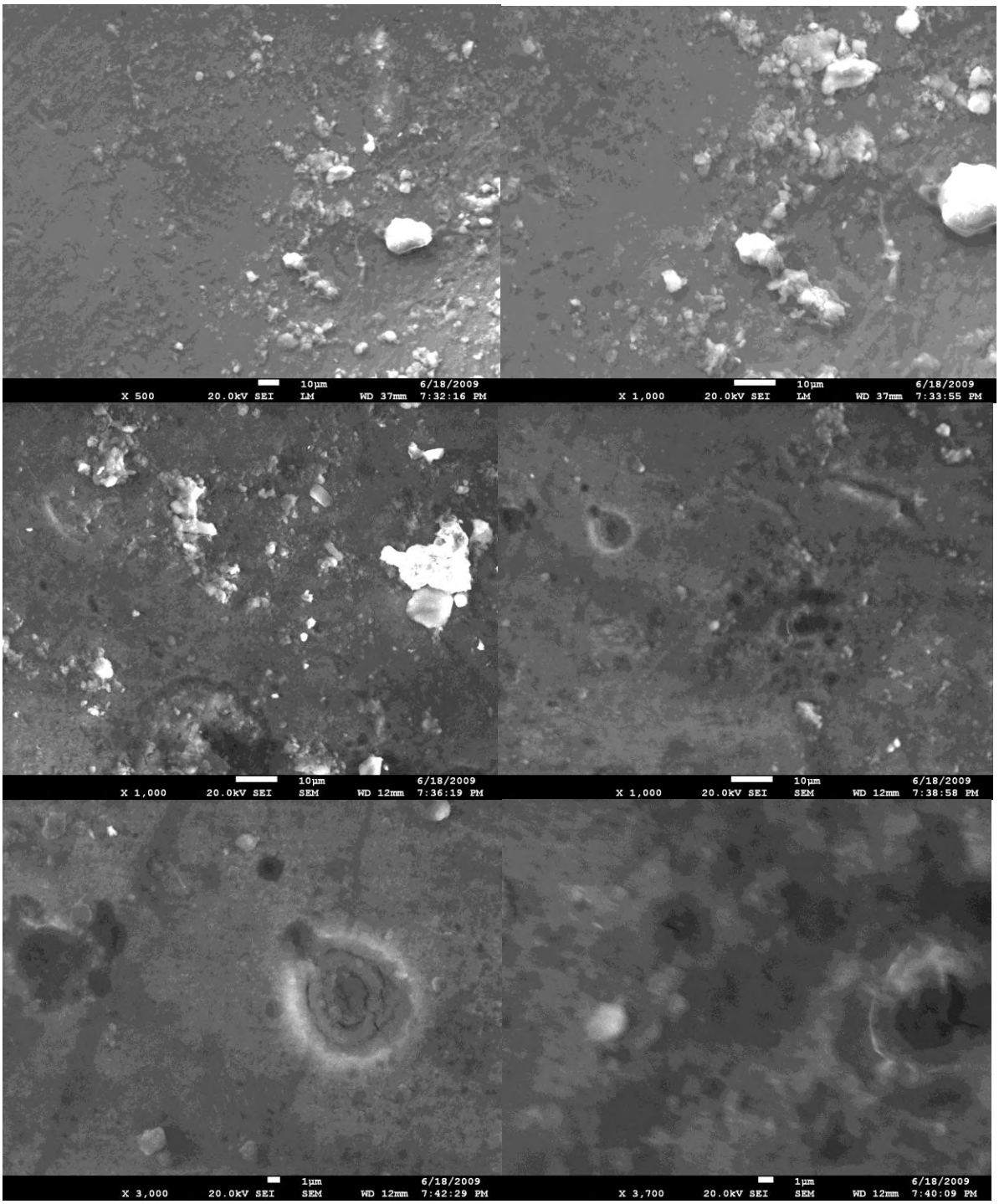


Figure 11-Sample W-5- Image (a)-500X, Image (b)-1000X, Image (c)-1000X, Image (d)-1000X, Image (e)-3000X, Image (f)-3700X

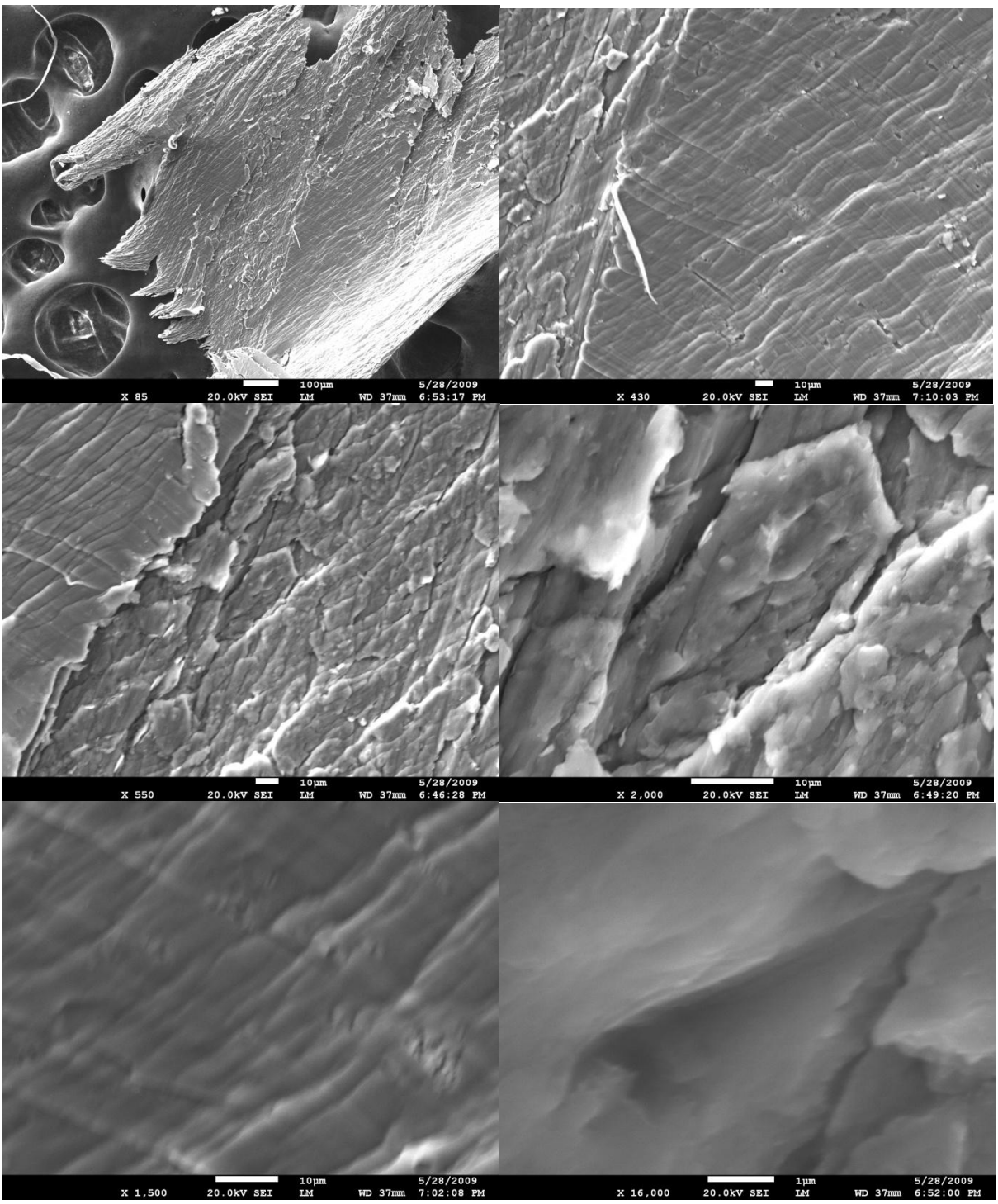


Figure 12-Sample W-6- Image (a)-85X, Image (b)-430X, Image (c)-550X, Image (d)-2000X, Image (e)-2500X, Image (f)-14000X

EDX Data

Energy Dispersive X-ray (EDX) elemental analysis was performed on all six Wade samples, in the course of obtaining the SEM images. This analysis enables detection of elements present in relatively high amounts, and gives the relative proportions of each.

EDX elemental mapping and point-and-shoot were done on selected sample areas, in addition to the standard EDX spectra, which are elemental abundance averages over the area imaged. EDX mapping shows a map of the relative concentrations of the elements detected in the imaged area, while EDX point-and-shoot displays EDX spectra at selected points of an imaged area, highlighting differences in the composition of imaged features.

The major component of the metallic portions of all of the samples proved to be aluminum (Al). All of the samples appeared to be composed of aluminum alloys, with varying amounts of alloying elements. Other elements detected included beryllium (Be), carbon (C), oxygen (O), sodium (Na), magnesium (Mg), silicon (Si), phosphorus (P), sulfur (S), chlorine (Cl), potassium (K), calcium (Ca), titanium (Ti), iron (Fe), and palladium (Pd).

The coating layers of the coated samples were much different in composition from the metallic portions of the samples. Aluminum was still a major component of the coatings, but was present to a lesser degree than in the metallic portions of the samples.

The amount of oxygen in the coatings was much greater than in the metallic phase of the samples, indicating that the aluminum was probably present as an oxide layer, rather than as free metal. The proportions of carbon, silicon, and chlorine in the coatings were also higher than in the metal, indicating the probable presence of metallic silicates, carbonates, and chlorides as components of the coatings.

All of the elements detected in the metallic phases were also present in the coatings. Some elements were also present in the coatings which were not detected in the metallic phases; these included nickel (Ni), and barium (Ba). The coatings of samples W-1 and W-6 were also quite similar to one another. The coatings on samples W-2 and W-3 had not been analyzed by SEM/EDX as of the date of this report, but may be in the near future.

The EDX mapping of the coating of sample W-1 indicated that the oxygen, silicon, potassium, calcium, and carbon in the coating tend to be concentrated in particles on the surface, which appear lighter in the SEM images (Figure 15). The EDX point-and-shoot technique confirmed this (Figure 16). The majority of the darker coating surface appears to consist of aluminum oxide.

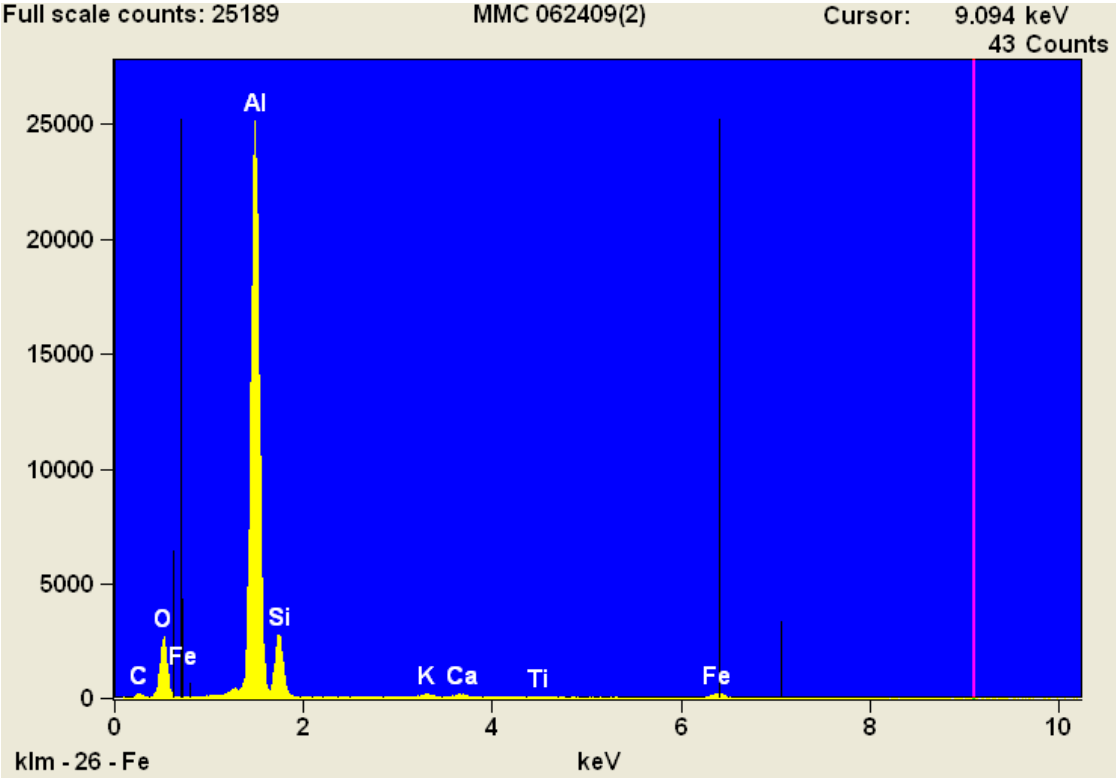


Figure 13-EDX of Sample W-1- Metallic Portion of Sample

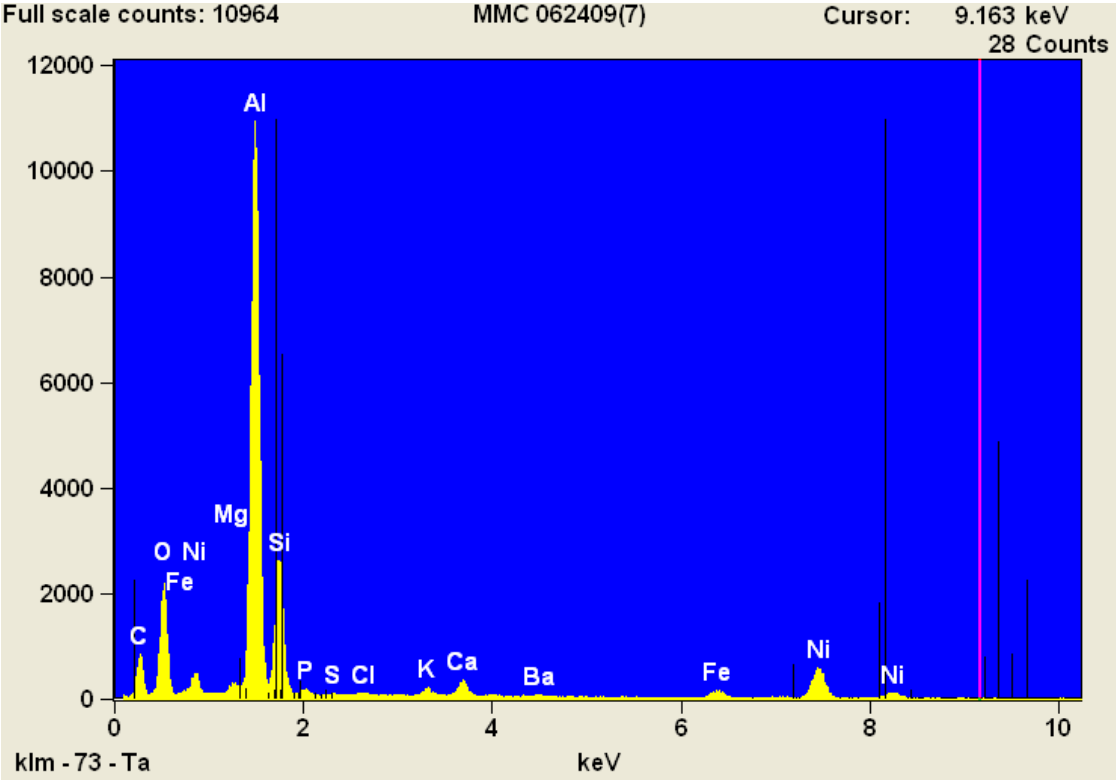


Figure 14-EDX of Sample W-1- Coating of Sample

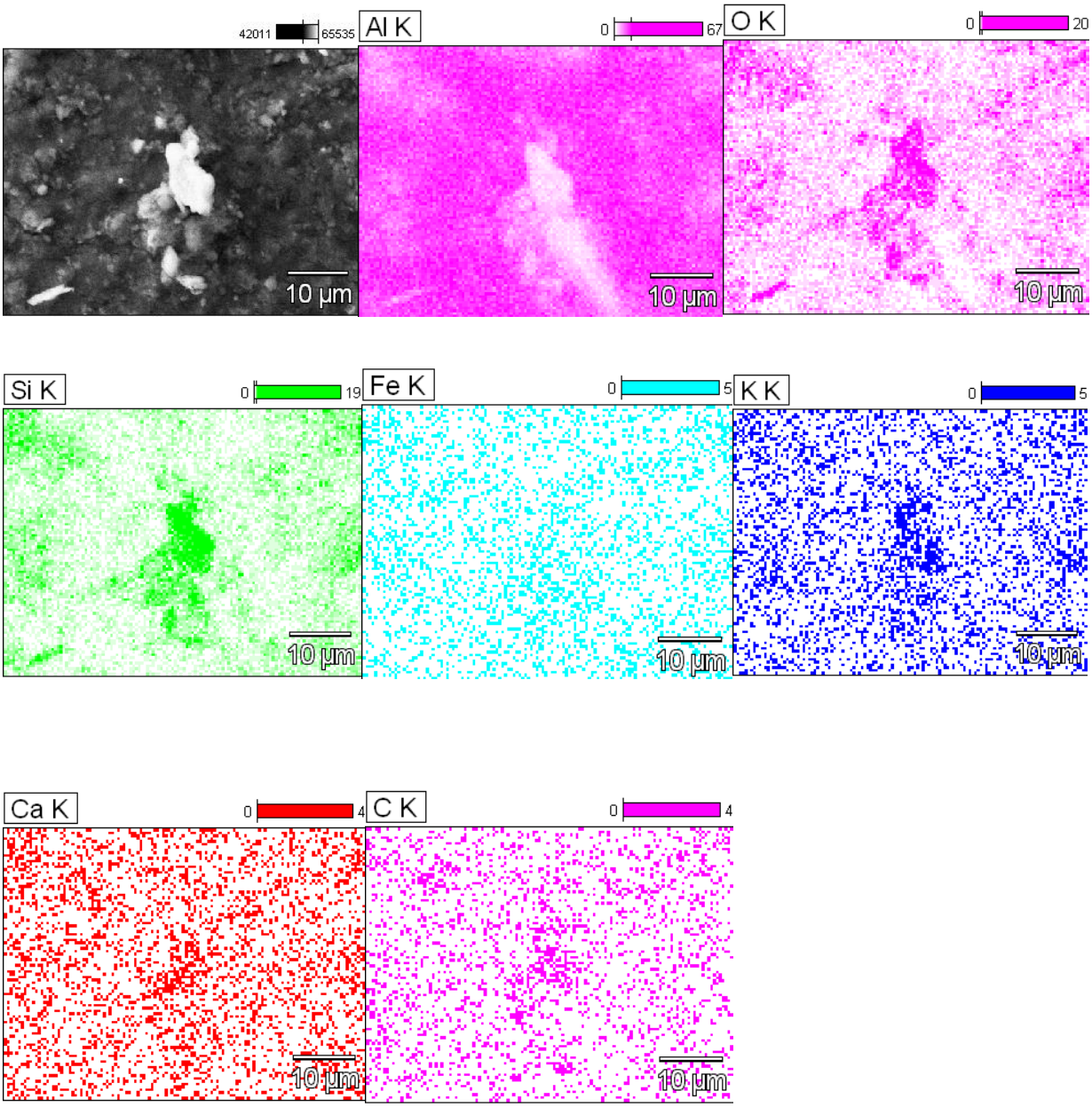
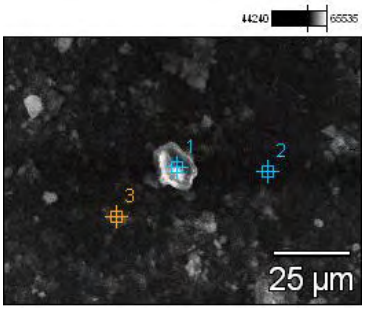
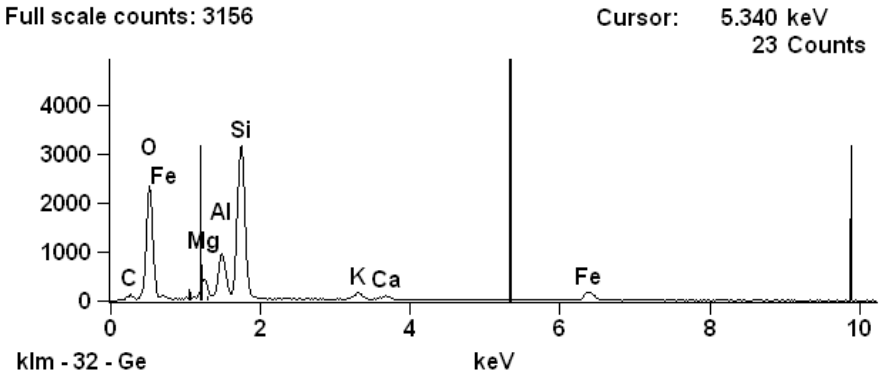
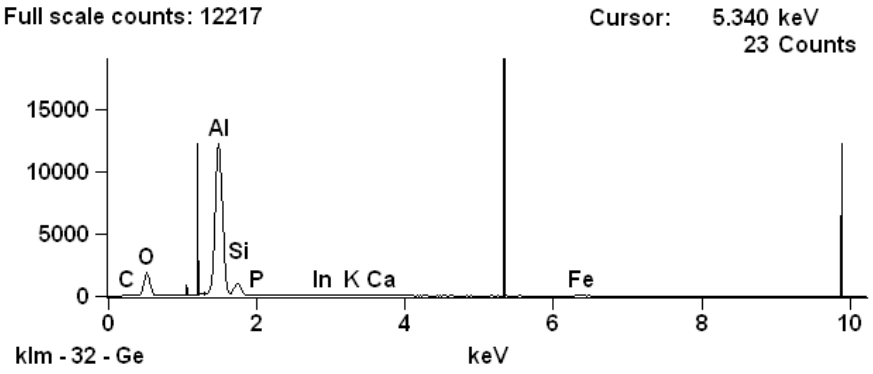


Figure 15-EDX Mapping of Sample W-1- Metallic Portion of Sample







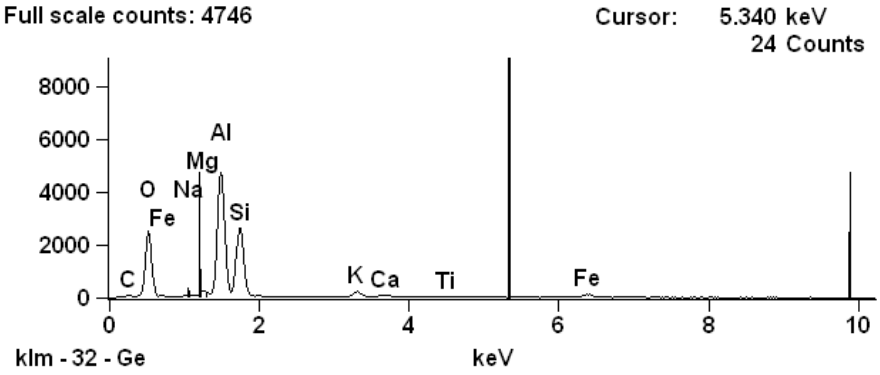


Figure 16-EDX Point and Shoot of Sample W-1-Metallic Portion of Sample

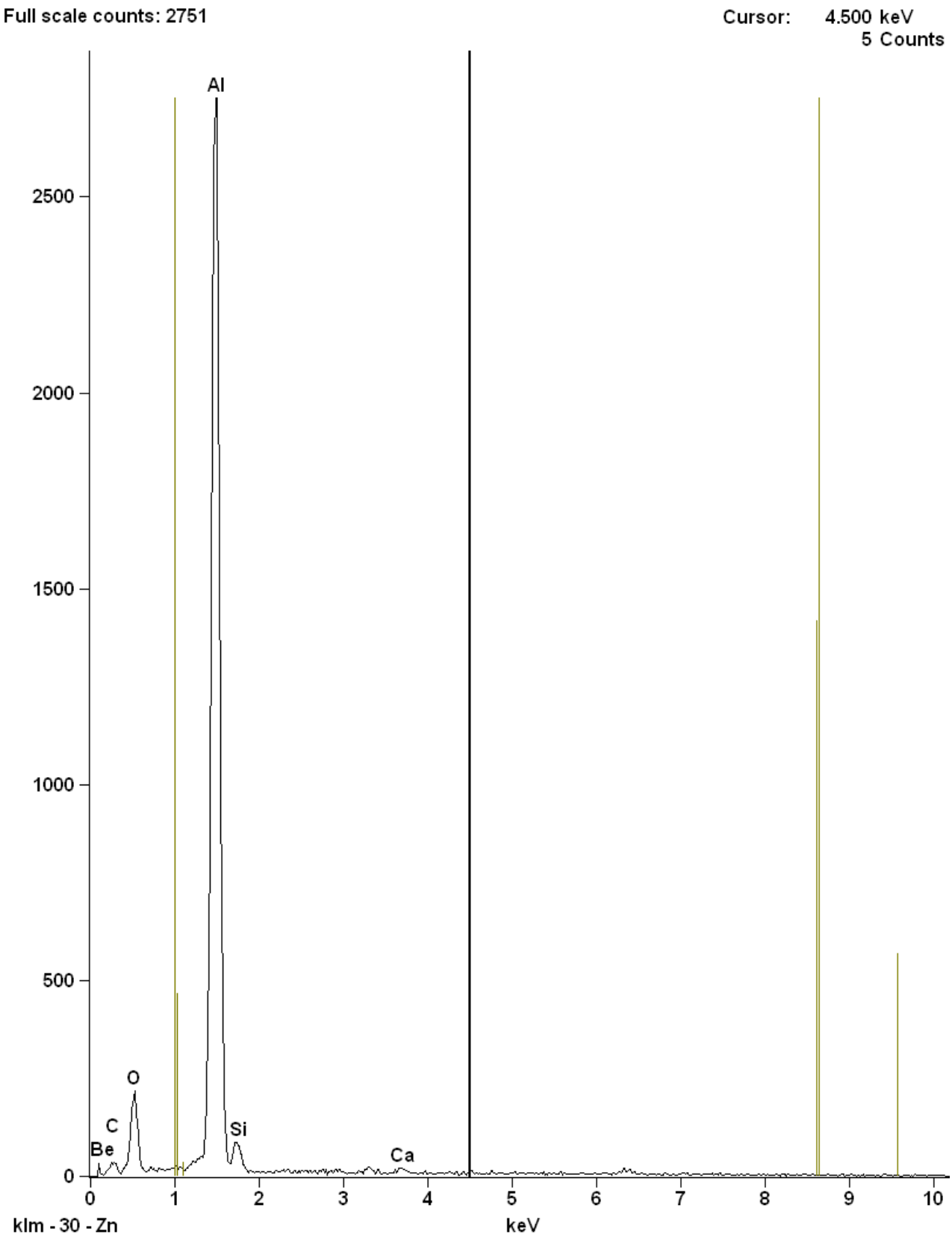


Figure 17-EDX of Sample W-3- Metallic Portion of Sample

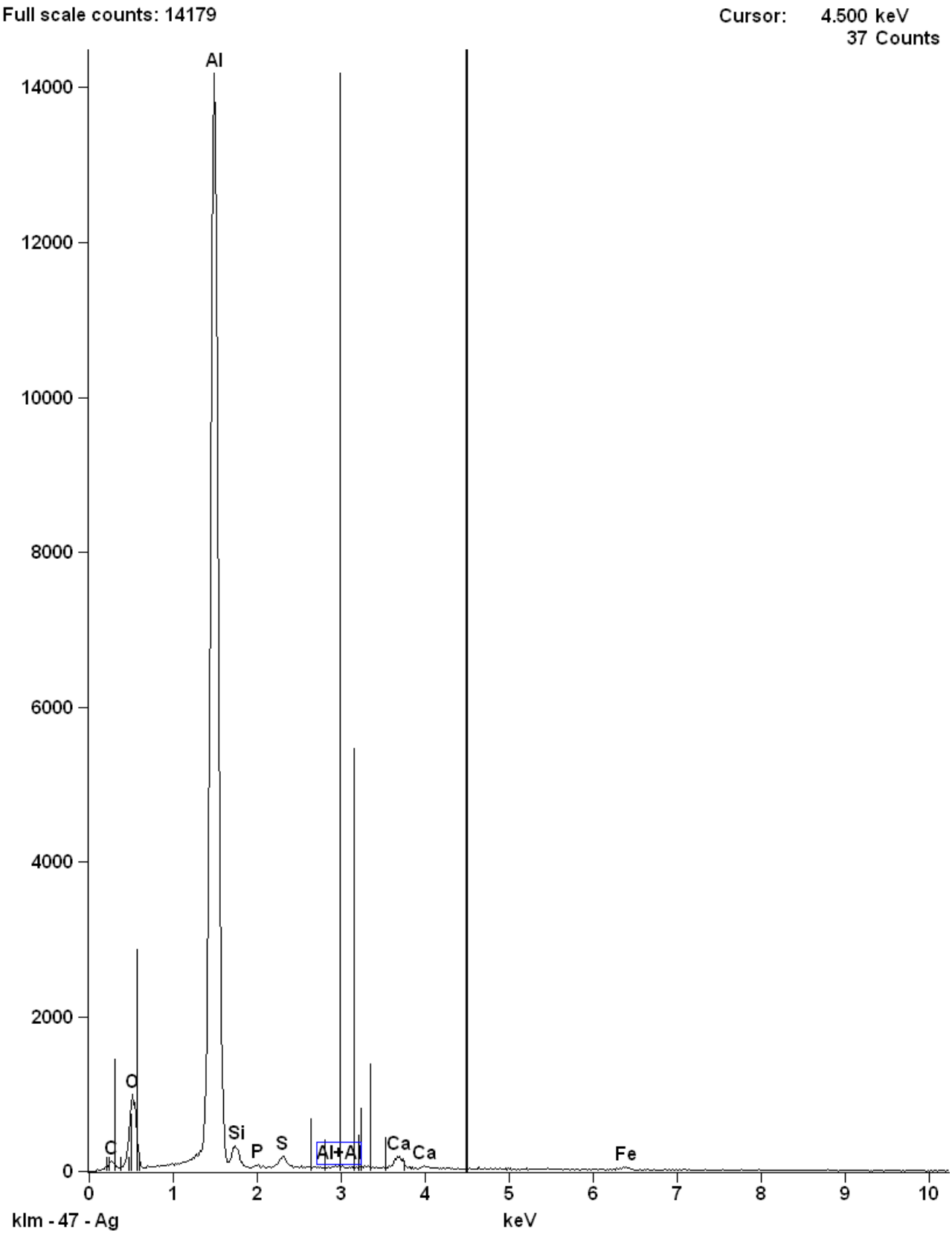


Figure 18-EDX of Sample W-4- Metallic Portion of Sample-No Coating

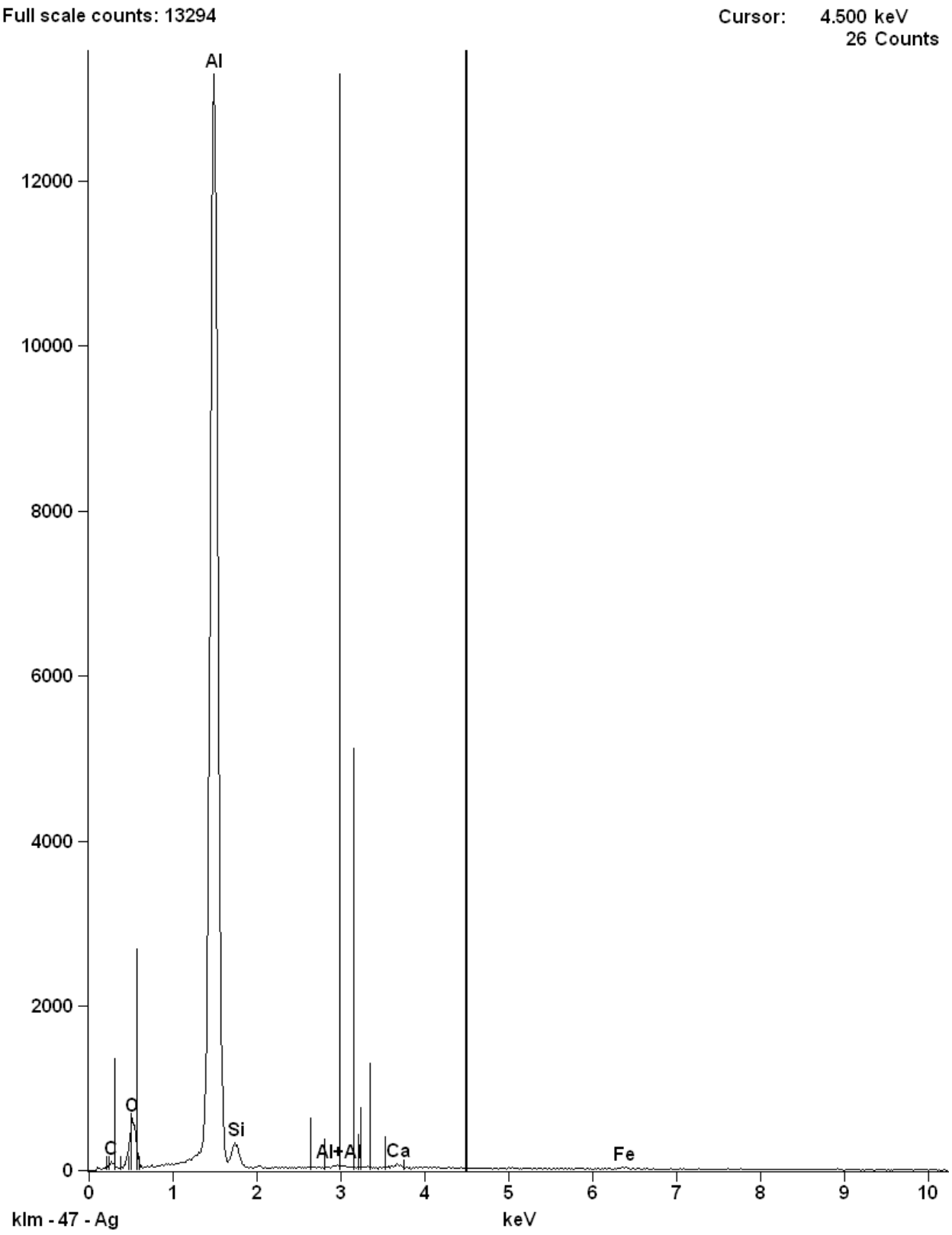


Figure 19-EDX of Sample W-5- Metallic Portion of Sample-No Coating

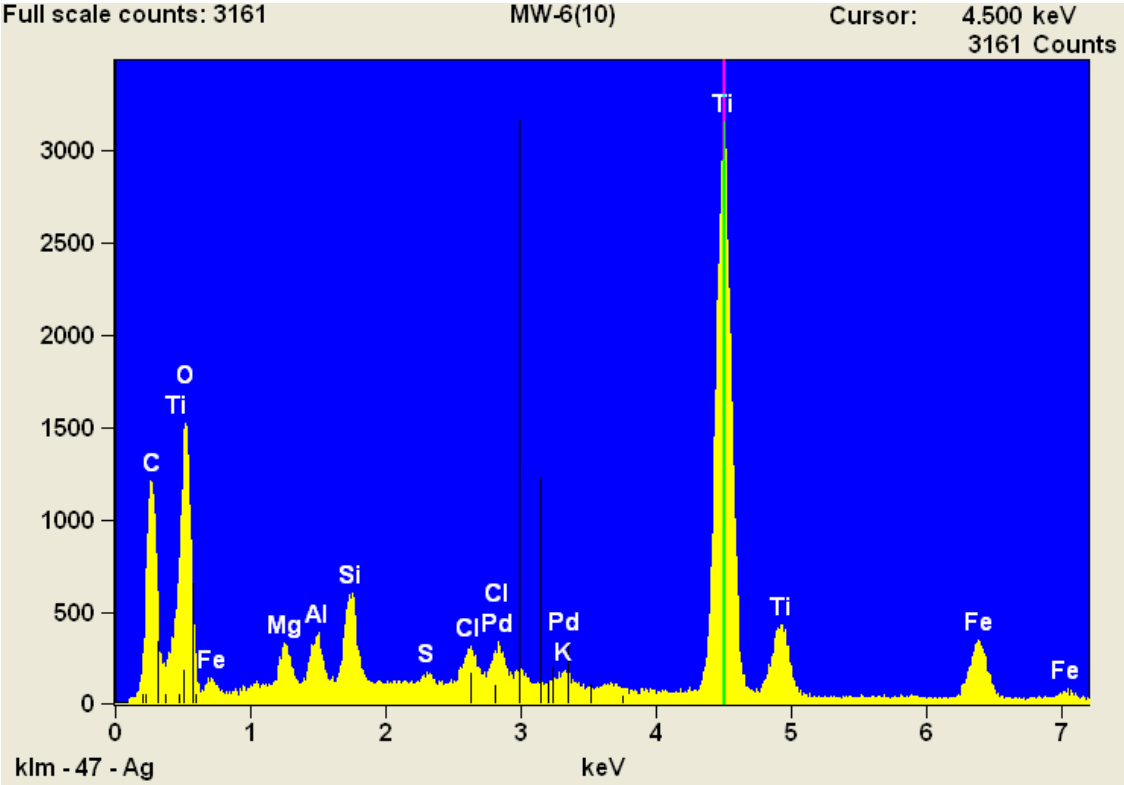


Figure 20-EDX of Sample W-6- Metallic Portion of Sample

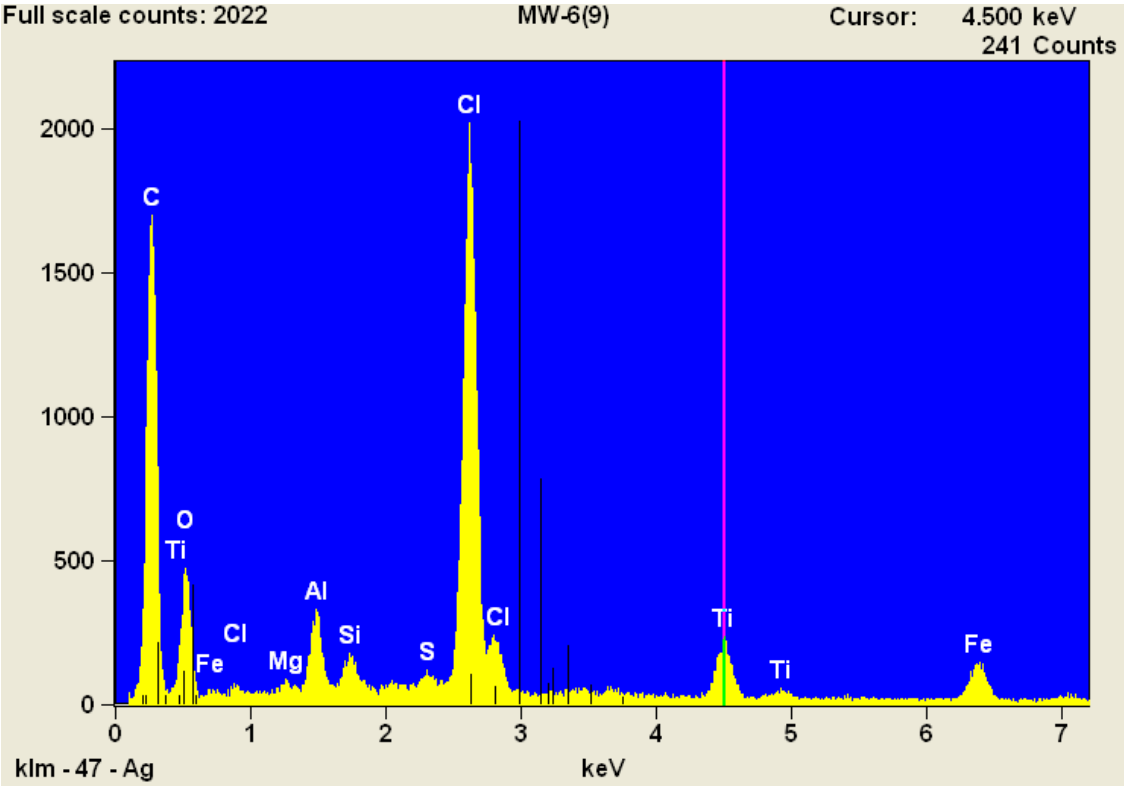


Figure 21-EDX of Sample W-6- Coating Portion of Sample

Magnetic and Electrical Analysis

None of the samples were attracted to a strong Neodymium-Iron-Boron magnet, and are therefore not ferromagnetic.

All of the samples were tested with a volt-ohmmeter, and were found to conduct electricity. Quantitative values of sample resistivities will be determined when more of each sample is available.

Raman Spectroscopy

Raman spectroscopy at 532 nm laser wavelength was carried out on the samples primarily to test for the presence of carbon nanotubes, as this is a sensitive and reliable test for their presence in a material.

The presence of carbon nanotubes in the samples was suspected because of the previous detection of carbon nanotubes in an alien implant sample, which was recently (2008) removed from the body of an American materials scientist. Carbon nanotubes are currently being actively researched in Earthly materials science because of their uniquely high strength-weight ratio, and electronic properties, and it was hypothesized that much of the alien technology may utilize these materials.

The Raman data for all six samples is shown in Figures 22-24. The Raman wavenumber range which was chosen for the analysis encompasses the range at which carbon nanotubes absorb laser radiation.

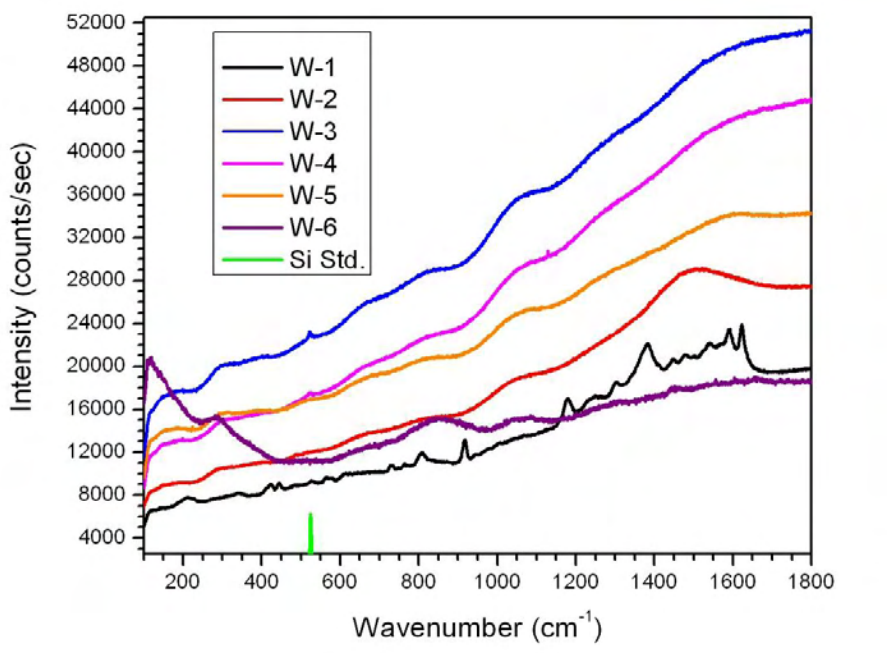


Figure 22-532 nm Raman Spectrum of all Wade Samples-Fullscale

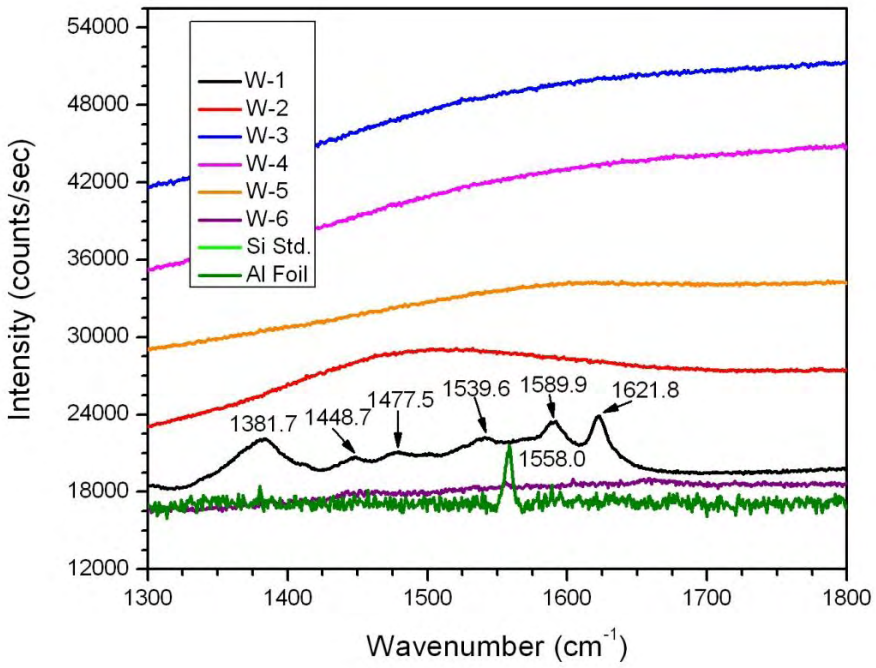


Figure 23-532 nm Raman Spectrum of all Wade Samples-D and G Bands

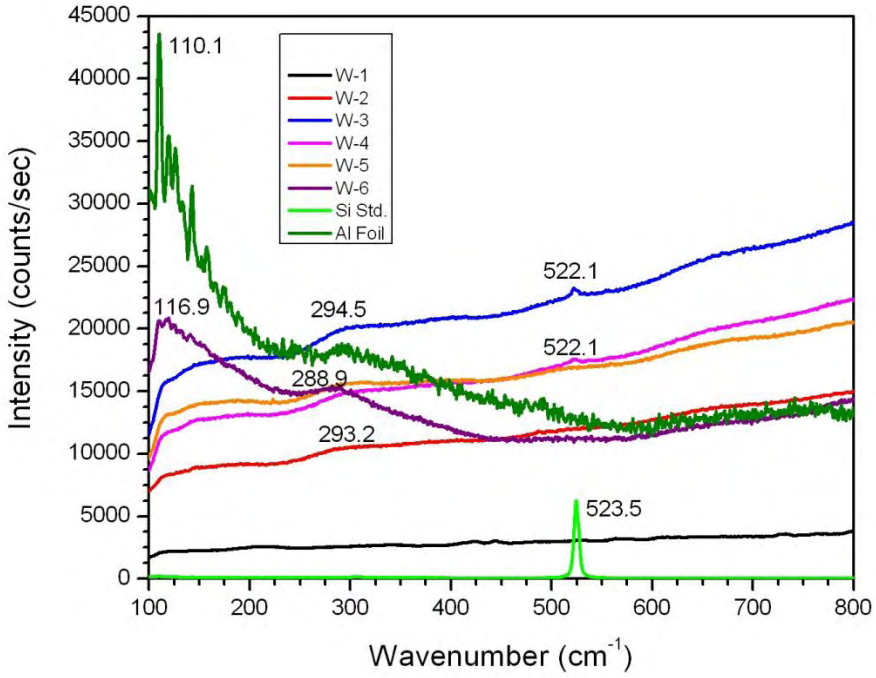


Figure 24-532 nm Raman Spectrum of all Wade Samples-RBM Band

There are peaks in the spectra of all of the samples (Figures 22 and 24) which appear to be caused by the presence of aluminum oxide (Al_2O_3, 110-116 cm^{-1} and 289-295 cm^{-1}), and the band structure of metallic aluminum (Al, 522 cm^{-1}).

The Raman evidence for the presence of carbon nanotubes is inconclusive for samples W-2 through W-6. Weak peaks appear in the area of 1200 cm^{-1} to 1600 cm^{-1}, which could be produced by single-walled carbon nanotube D and G bands, but the signals are too weak to permit positive identification as such.

Sample W-1, however, does appear to have peaks that have a much higher probability of being caused by the presence of single-walled carbon nanotube D (1381.7 cm^{-1}, 1448.7 cm^{-1}, and 1477.5 cm^{-1}) and G bands (1539.6 cm^{-1}, 1589.9 cm^{-1}, and 1621.8 cm^{-1}, Figure 23).

ICP-MS Analysis

Pieces of all of the samples were subjected to trace element analysis by Inductively Coupled Plasma Mass Spectroscopic (ICP-MS) analysis, performed by BodyCote testing lab, in Santa Fe Springs, CA.

This analysis involves dissolving small amounts of each sample (10 mg) in a mixture of nitric and hydrochloric acids, and passing the solution through a plasma torch. The resulting plasma, containing ions (charged atoms) of the elements in the sample are then passed through a mass spectrometer, which sorts the ions by charge/mass ratio.

This analysis provides sensitive, and quantitative, results on the amounts of all elements present in the sample. Amounts of most elements below parts-per-million (ppm) levels can be detected using this analysis.

Sixty-eight (68) elements were tested for, with fifty-six (56) elements being detected in at least one sample. The results of the analysis, with elements tested for in alphabetical order, are shown in Table 1. The last column in the table is the average amount of each element detected for all six samples.

The results of the analysis, with elements listed in order of average abundance in all six samples, is shown in Table 2.

Aluminum (Al, average concentration 95.6%) was the most abundant element in all of the samples, followed by iron (Fe, ave. 2.40%), silicon (Si, ave. 1.02%), calcium (Ca, ave. 0.41%), manganese (Mn, ave. 0.25%), magnesium (Mg, ave. 0.22%), potassium (K, ave. 0.07%; 707 ppm), titanium (Ti, ave. 0.03%; 333 ppm), copper (Cu, ave. 0.03%; 317 ppm), phosphorus (P, ave. 0.03%; 310 ppm), zinc (Zn, ave. 0.03%, 309 ppm), sodium (Na, 0.02; 155 ppm).

The amounts of the most abundant elements in the six samples varied widely with the specific sample, implying differences in function. The amounts of the most abundant elements in the samples are shown graphically in Figures 25-27.

The maximum, minimum, and average amounts of all of the elements in the samples are shown in Table 3 (See Appendix).

Table 1-ICP-MS Results for San Augustine Crash Debris Samples-All Elements Tested For

Element	Sample Number												
	W-1		W-2		W-3		W-4		W-5		W-6		Ave.
	Conc. (ppm)	Det. Limit (ppm)	Conc. (ppm)	Det. Limit (ppm)	Conc. (ppm)	Det. Limit (ppm)	Conc. (ppm)	Det. Limit (ppm)	Conc. (ppm)	Det. Limit (ppm)	Conc. (ppm)	Det. Limit (ppm)	Conc. (ppm)
Aluminum	Matrix	NS	Matrix	NS	790000	7	Matrix	NS	Matrix	NS	Matrix	NS	95.6%
Antimony	0.17	0.05	0.24	0.04	ND	0.3	0.69	0.3	ND	0.3	ND	0.3	0.18
Arsenic	0.64	0.06	ND	2	1.1	0.5	2.1	0.8	1.4	0.9	ND	0.8	0.87
Barium	56	0.009	71	0.2	27	0.09	48	0.2	75	0.2	4.9	0.05	47.0
Beryllum	0.21	0.008	0.19	0.02	0.59	0.05	0.75	0.06	0.32	0.07	0.41	0.03	0.41
Bismuth	0.042	0.008	0.34	0.02	0.21	0.05	0.32	0.09	1.1	0.09	ND	0.03	0.34
Boron	ND	3	7.8	2	6.4	3	14	3	11	3	ND	3	6.5
Bromine	ND	20	ND	50	ND	20	ND	30	ND	30	ND	30	0
Cadmium	0.22	0.008	0.10	0.02	0.17	0.05	0.48	0.06	0.28	0.07	0.19	0.04	0.24
Calcium	840	10	18000	20	660	10	2200	40	2800	40	64	10	4094
Cerium	5.7	0.008	2.7	0.02	8.6	0.05	13	0.06	7.6	0.07	1.4	0.03	6.5
Cesium	0.57	0.008	ND	0.02	0.44	0.2	0.45	0.3	ND	0.3	ND	0.07	0.24
Chromium	15	0.3	20	0.2	17	3	20	0.4	9.2	0.5	260	0.1	56.9
Cobalt	5.3	0.01	3.6	0.02	3.2	0.005	3.6	0.007	2.5	0.07	2.0	0.04	3.4
Copper	15	0.09	730	0.6	85	0.7	100	0.3	140	0.3	830	0.2	317
Dysprosium	0.39	0.008	0.30	0.02	0.54	0.05	1.1	0.06	0.50	0.07	0.10	0.03	0.49
Erbium	0.23	0.008	0.17	0.02	0.38	0.05	0.63	0.06	0.32	0.07	0.05	0.03	0.30
Europium	0.074	0.008	0.05	0.02	0.11	0.05	0.12	0.06	ND	0.07	ND	0.03	0.06
Gadolinium	0.50	0.008	0.34	0.02	0.81	0.05	1.5	0.06	0.88	0.07	0.12	0.03	0.69
Gallium	31	0.008	26	0.02	38	0.05	39	0.06	22	0.07	32	0.03	31
Germanium	1.0	0.05	0.33	0.08	ND	0.6	ND	0.2	ND	0.2	ND	0.04	0.22
Gold	ND	0.07	ND	0.2	ND	0.06	ND	3	ND	3	3.5	0.4	0.6
Hafnium	1.3	0.008	2.2	0.02	0.52	0.05	0.69	0.06	0.60	0.07	0.58	0.03	0.98
Holmium	0.080	0.008	0.06	0.02	0.09	0.05	0.24	0.06	ND	0.07	ND	0.03	0.08
Iodine	0.70	0.2	0.82	0.03	ND	0.1	ND	0.4	ND	0.4	ND	0.1	0.25
Iridium	ND	0.008	ND	0.02	ND	0.05	ND	0.06	ND	0.07	ND	0.03	0
Iron	7600	1	7100	10	8800	7	111000	10	5100	10	4500	0.7	24017
Lanthanum	2.4	0.04	0.77	0.2	3.9	0.2	4.9	0.9	2.9	0.9	0.73	0.03	2.6
Lead	6.7	0.05	19	0.1	9.4	0.3	17	0.4	12	0.4	11	0.1	12.5
Lithium	5.6	0.07	4.4	2	ND	7	ND	8	ND	9	ND	4	1.7
Lutetium	ND	0.2	ND	0.2	ND	3	ND	2	ND	2	ND	0.8	0
Magnesium	620	3	1900	4	530	5	850	8	630	9	8800	2	2222
Manganese	120	0.03	5900	0.04	170	0.1	200	0.2	100	0.2	8800	0.03	2548
Mercury	ND	0.02	0.11	0.04	ND	0.05	ND	0.8	ND	0.9	ND	0.05	0.02
Molybdenum	1.2	0.08	2.4	0.3	3.0	0.4	3.9	1	ND	1	6.9	0.7	2.9
Neodymium	1.7	0.008	0.99	0.02	2.2	0.05	4.0	0.06	2.2	0.07	0.33	0.03	1.9

Nickel	27	0.04	42	0.1	54	0.4	62	0.2	26	0.2	29	0.03	40
Niobium	1.3	0.1	ND	3	0.45	0.05	1.1	0.06	1.1	0.07	0.54	0.03	0.7
Osmium	ND	0.09	ND	0.02	ND	0.2	ND	0.2	ND	0.2	ND	0.03	0
Palladium	ND	0.008	ND	0.02	ND	0.05	ND	1	ND	1	ND	3	0
Phosphorus	290	10	100	40	370	70	640	20	430	20	28	10	310
Platinum	ND	0.2	ND	0.6	ND	0.4	ND	0.3	ND	0.3	0.13	0.06	0.02
Potassium	1600	10	940	100	350	200	710	300	640	300	ND	80	707
Praseodymium	0.38	0.008	0.22	0.02	0.52	0.05	0.88	0.06	0.51	0.07	0.09	0.03	0.50
Rhenium	ND	0.008	ND	0.02	ND	0.05	ND	0.06	ND	0.07	ND	0.03	0
Rhodium	ND	0.008	ND	0.02	ND	0.05	ND	0.1	ND	0.1	ND	0.05	0
Rubidium	7.9	0.008	1.7	0.03	2.0	0.05	3.1	0.4	2.4	0.4	0.23	0.1	2.9
Ruthenium	ND	0.008	ND	0.02	ND	0.05	ND	0.06	ND	0.07	ND	0.03	0
Samarium	0.31	0.008	0.20	0.02	0.45	0.05	0.76	0.06	0.40	0.07	0.04	0.03	0.36
Selenium	0.30	0.2	ND	1	ND	3	ND	6	ND	7	ND	3	0.05
Silicon	26000	6000	25000	10000	2800	50	3000	40	2700	50	1700	20	10200
Silver	ND	0.03	ND	0.1	0.21	0.05	0.17	0.1	0.36	0.1	0.31	0.1	0.18
Sodium	560	5	270	30	ND	70	ND	200	ND	200	100	60	155
Strontium	17	0.02	66	0.1	6.6	0.1	20	0.3	51	0.3	0.50	0.07	27
Tantalum	ND	0.2	ND	3	ND	0.05	ND	0.2	ND	0.2	ND	0.03	0
Tellurium	ND	0.09	ND	0.1	ND	0.4	ND	4	ND	5	ND	3	0
Thallium	0.26	0.1	0.51	0.3	0.21	0.1	ND	3	ND	3	ND	0.4	0.16
Thorium	0.81	0.008	1.8	0.02	1.9	0.7	2.3	0.3	1.4	0.3	0.26	0.03	1.4
Thulium	0.036	0.008	0.03	0.02	ND	0.05	0.11	0.06	ND	0.07	ND	0.03	0.03
Tin	1.7	0.04	2.8	0.05	1.7	0.09	2.5	0.4	3.2	0.4	9.1	0.07	3.5
Titanium	300	2	600	0.8	270	0.3	350	1	290	1	190	0.3	333
Tungsten	0.64	0.07	2.9	0.3	0.47	0.06	ND	2	ND	2	1.0	0.03	0.84
Uranium	0.83	0.008	3.3	0.02	0.75	0.05	1.2	0.06	1.0	0.07	0.53	0.03	1.3
Vanadium	86	0.2	95	0.4	79	6	99	0.9	78	0.9	89	0.5	88
Ytterbium	0.25	0.008	0.20	0.02	0.46	0.1	0.70	0.06	0.32	0.07	0.05	0.03	0.33
Yttrium	1.9	0.01	0.44	0.02	2.4	0.05	5.2	0.2	2.6	0.2	0.38	0.05	2.2
Zinc	63	0.3	160	0.4	130	2	170	4	130	5	1200	0.4	309
Zirconium	23	0.1	25	0.5	9.9	0.08	16	0.7	18	0.7	12	0.08	17

68 elements were analyzed for. 56 elements were detected in at least one sample. Elements analyzed for and not detected in any samples: Bromine, Gold, Iridium, Lutetium, Osmium, Palladium, Rhenium, Rhodium, Ruthenium, Tantalum, Tellurium

Table 2-Elements Detected by ICP-MS-in Order of Average Abundance

Element	Sample Number											
	W-1		W-2		W-3		W-4		W-5		W-6	
	Conc. (ppm)	Det. Limit (ppm)	Conc. (ppm)	Det. Limit (ppm	Conc. (ppm)	Det. Limit (ppm	Conc. (ppm)	Det. Limit (ppm	Conc. (ppm)	Det. Limit (ppm	Conc. (ppm)	Det. Limit (ppm
Aluminum	Matrix	NS	Matrix	NS	790000	7	Matrix	NS	Matrix	NS	Matrix	NS
Iron	7600	1	7100	10	8800	7	111000	10	5100	10	4500	0.7
Silicon	26000	6000	25000	10000	2800	50	3000	40	2700	50	1700	20
Calcium	840	10	18000	20	660	10	2200	40	2800	40	64	10
Manganese	120	0.03	5900	0.04	170	0.1	200	0.2	100	0.2	8800	0.03
Magnesium	620	3	1900	4	530	5	850	8	630	9	8800	2
Potassium	1600	10	940	100	350	200	710	300	640	300	ND	80
Titanium	300	2	600	0.8	270	0.3	350	1	290	1	190	0.3
Copper	15	0.09	730	0.6	85	0.7	100	0.3	140	0.3	830	0.2
Phosphorus	290	10	100	40	370	70	640	20	430	20	28	10
Zinc	63	0.3	160	0.4	130	2	170	4	130	5	1200	0.4
Sodium	560	5	270	30	ND	70	ND	200	ND	200	100	60
Vanadium	86	0.2	95	0.4	79	6	99	0.9	78	0.9	89	0.5
Chromium	15	0.3	20	0.2	17	3	20	0.4	9.2	0.5	260	0.1
Barium	56	0.009	71	0.2	27	0.09	48	0.2	75	0.2	4.9	0.05
Nickel	27	0.04	42	0.1	54	0.4	62	0.2	26	0.2	29	0.03
Gallium	31	0.008	26	0.02	38	0.05	39	0.06	22	0.07	32	0.03
Strontium	17	0.02	66	0.1	6.6	0.1	20	0.3	51	0.3	0.50	0.07
Zirconium	23	0.1	25	0.5	9.9	0.08	16	0.7	18	0.7	12	0.08
Lead	6.7	0.05	19	0.1	9.4	0.3	17	0.4	12	0.4	11	0.1
Boron	ND	3	7.8	2	6.4	3	14	3	11	3	ND	3
Cerium	5.7	0.008	2.7	0.02	8.6	0.05	13	0.06	7.6	0.07	1.4	0.03
Tin	1.7	0.04	2.8	0.05	1.7	0.09	2.5	0.4	3.2	0.4	9.1	0.07
Cobalt	5.3	0.01	3.6	0.02	3.2	0.005	3.6	0.007	2.5	0.07	2.0	0.04
Rubidium	7.9	0.008	1.7	0.03	2.0	0.05	3.1	0.4	2.4	0.4	0.23	0.1
Molybdenum	1.2	0.08	2.4	0.3	3.0	0.4	3.9	1	ND	1	6.9	0.7
Lanthanum	2.4	0.04	0.77	0.2	3.9	0.2	4.9	0.9	2.9	0.9	0.73	0.03
Yttrium	1.9	0.01	0.44	0.02	2.4	0.05	5.2	0.2	2.6	0.2	0.38	0.05
Neodymium	1.7	0.008	0.99	0.02	2.2	0.05	4.0	0.06	2.2	0.07	0.33	0.03
Lithium	5.6	0.07	4.4	2	ND	7	ND	8	ND	9	ND	4
Thorium	0.81	0.008	1.8	0.02	1.9	0.7	2.3	0.3	1.4	0.3	0.26	0.03
Uranium	0.83	0.008	3.3	0.02	0.75	0.05	1.2	0.06	1.0	0.07	0.53	0.03
Hafnium	1.3	0.008	2.2	0.02	0.52	0.05	0.69	0.06	0.60	0.07	0.58	0.03
Arsenic	0.64	0.06	ND	2	1.1	0.5	2.1	0.8	1.4	0.9	ND	0.8
Tungsten	0.64	0.07	2.9	0.3	0.47	0.06	ND	2	ND	2	1.0	0.03
Niobium	1.3	0.1	ND	3	0.45	0.05	1.1	0.06	1.1	0.07	0.54	0.03
Gadolinium	0.50	0.008	0.34	0.02	0.81	0.05	1.5	0.06	0.88	0.07	0.12	0.03
Gold	ND	0.07	ND	0.2	ND	0.06	ND	3	ND	3	3.5	0.4
Praseodymium	0.38	0.008	0.22	0.02	0.52	0.05	0.88	0.06	0.51	0.07	0.09	0.03

Dysprosium	0.39	0.008	0.30	0.02	0.54	0.05	1.1	0.06	0.50	0.07	0.10	0.03
Beryllum	0.21	0.008	0.19	0.02	0.59	0.05	0.75	0.06	0.32	0.07	0.41	0.03
Samarium	0.31	0.008	0.20	0.02	0.45	0.05	0.76	0.06	0.40	0.07	0.04	0.03
Bismuth	0.042	0.008	0.34	0.02	0.21	0.05	0.32	0.09	1.1	0.09	ND	0.03
Ytterbium	0.25	0.008	0.20	0.02	0.46	0.1	0.70	0.06	0.32	0.07	0.05	0.03
Erbium	0.23	0.008	0.17	0.02	0.38	0.05	0.63	0.06	0.32	0.07	0.05	0.03
Iodine	0.70	0.2	0.82	0.03	ND	0.1	ND	0.4	ND	0.4	ND	0.1
Cadmium	0.22	0.008	0.10	0.02	0.17	0.05	0.48	0.06	0.28	0.07	0.19	0.04
Cesium	0.57	0.008	ND	0.02	0.44	0.2	0.45	0.3	ND	0.3	ND	0.07
Germanium	1.0	0.05	0.33	0.08	ND	0.6	ND	0.2	ND	0.2	ND	0.04
Silver	ND	0.03	ND	0.1	0.21	0.05	0.17	0.1	0.36	0.1	0.31	0.1
Antimony	0.17	0.05	0.24	0.04	ND	0.3	0.69	0.3	ND	0.3	ND	0.3
Thallium	0.26	0.1	0.51	0.3	0.21	0.1	ND	3	ND	3	ND	0.4
Holmium	0.080	0.008	0.06	0.02	0.09	0.05	0.24	0.06	ND	0.07	ND	0.03
Europium	0.074	0.008	0.05	0.02	0.11	0.05	0.12	0.06	ND	0.07	ND	0.03
Selenium	0.30	0.2	ND	1	ND	3	ND	6	ND	7	ND	3
Thulium	0.036	0.008	0.03	0.02	ND	0.05	0.11	0.06	ND	0.07	ND	0.03
Platinum	ND	0.2	ND	0.6	ND	0.4	ND	0.3	ND	0.3	0.13	0.06
Mercury	ND	0.02	0.11	0.04	ND	0.05	ND	0.8	ND	0.9	ND	0.05

Red denotes major component elements (100%-1%), green-minor component elements (10,000 ppm-1,000 ppm) blue-major trace elements (1,000 ppm-100 ppm), black-minor trace elements (< 100 ppm).

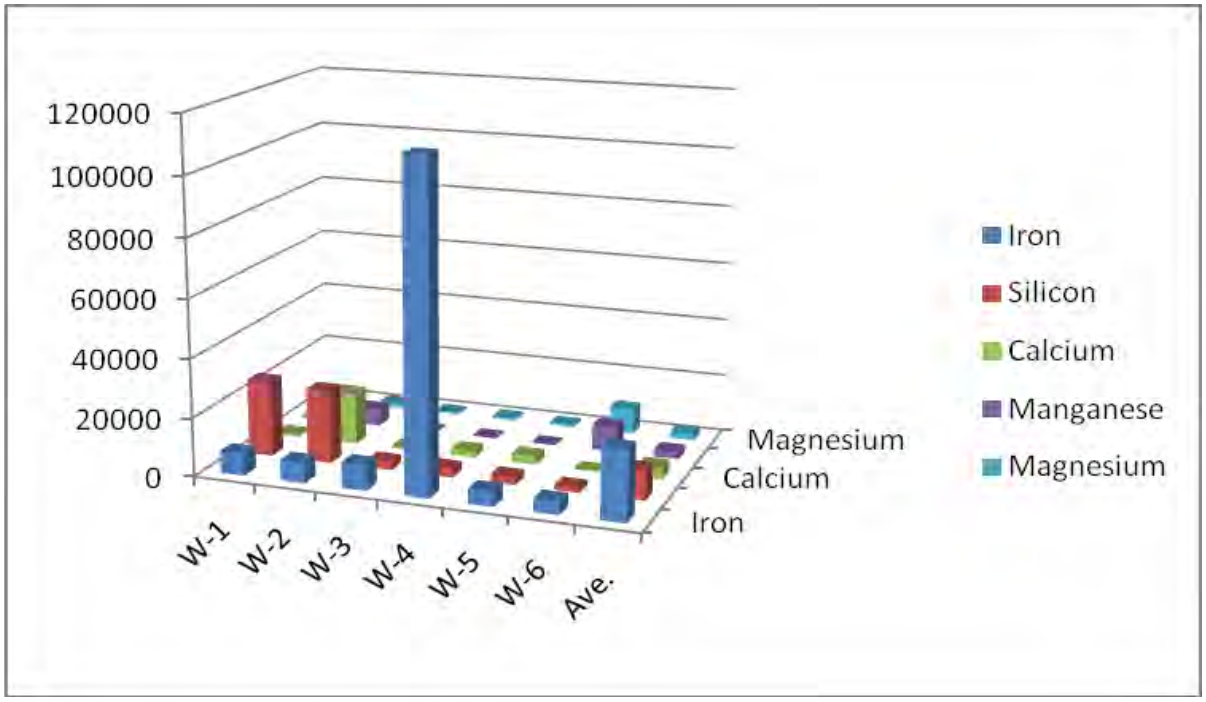


Figure 25-Amounts of Fe, Si, Ca, Mn, and Mg in each Sample-in parts per million (ppm)

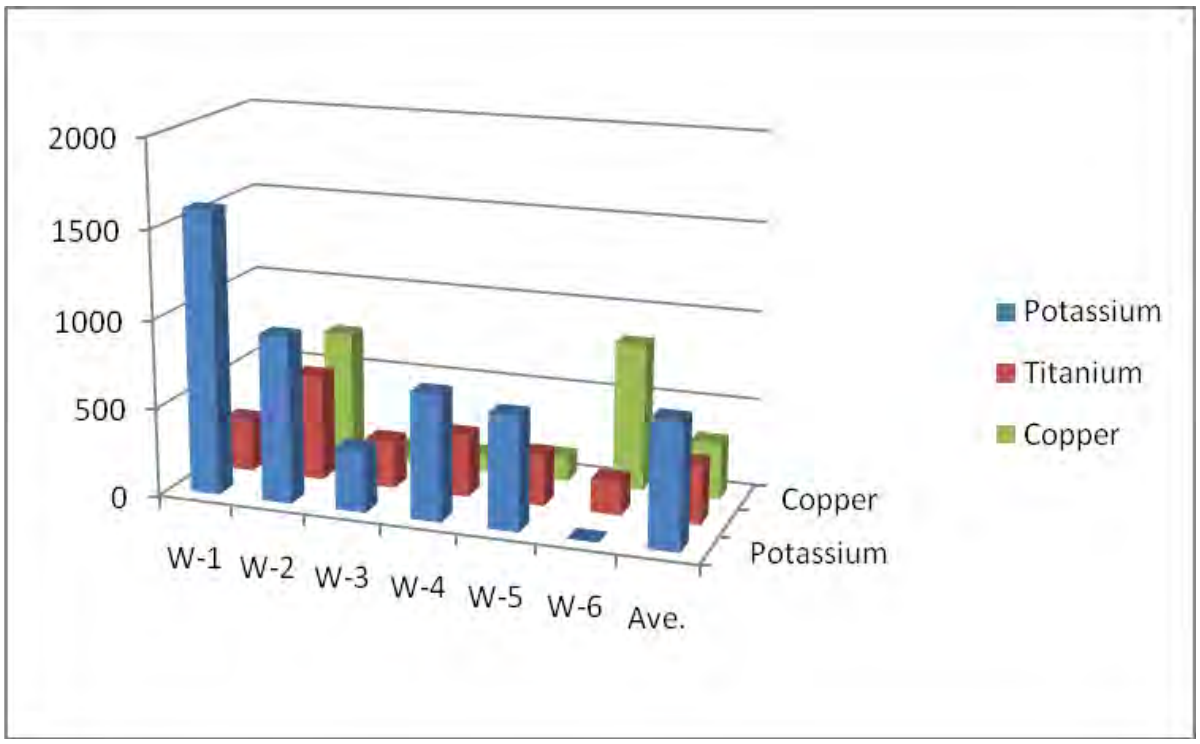


Figure 26- Amounts of K, Ti, and Cu in each Sample-in parts per million (ppm)

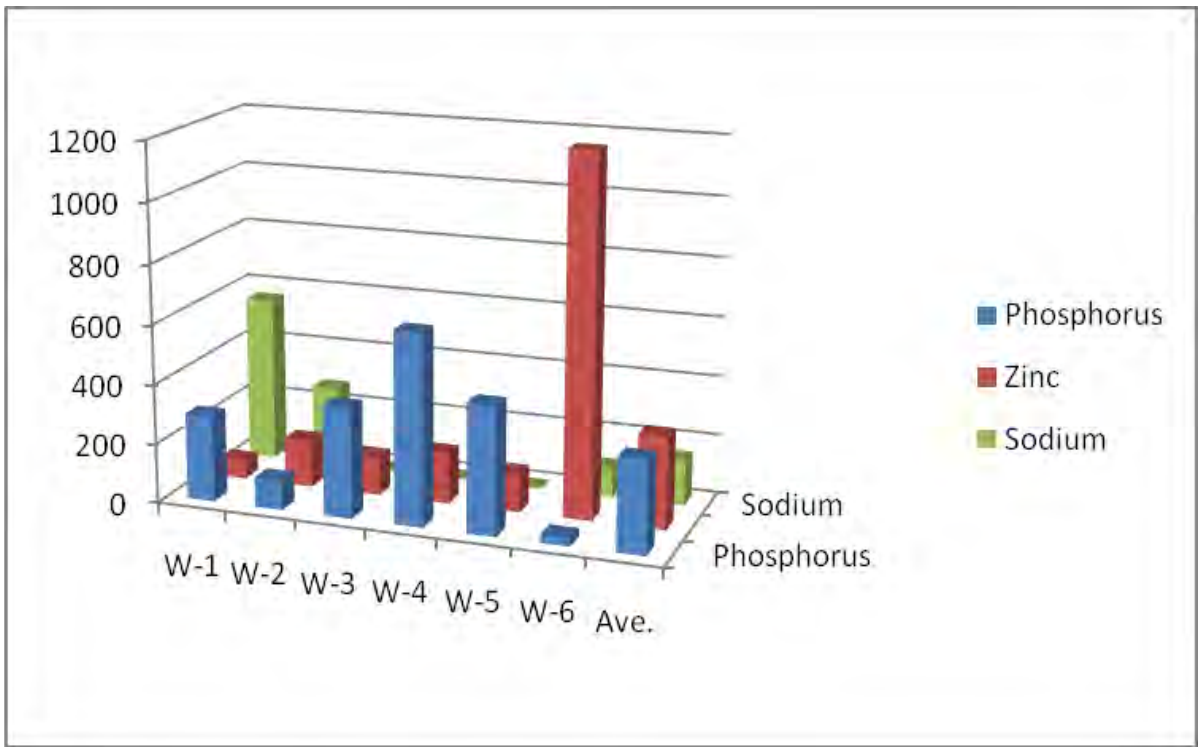


Figure 27- Amounts of P, Zn, and Na in each Sample-in parts per million (ppm

Isotopic Analysis of Sample W-1

Antimony (Sb), copper (Cu) and nickel (Ni) were the only elements present in the samples which were suitable to perform isotopic abundance calculations on from the raw ICP-MS data.

These elements were suitable for this analysis because there are no analytical interferences with their isotopes from other isotopes found in the samples.

The results of the isotopic abundance calculations for sample W-1 are shown in Table 3.

These results are very unusual, and show extremely skewed isotopic ratios in the three tested elements, relative to the normal terrestrial amounts of the isotopes in each of these elements.

Table 3-Isotopic Ratios of Suitable Elements in Sample W-1

Element	Isotope	Sample Isotopic Abundance (%)	Terrestrial Isotopic Abundance (%)
Antimony	Sb^{121}	49.58	57.36
	Sb^{123}	50.42	42.64
Copper	Cu^{63}	48.84	69.15
	Cu^{65}	51.16	30.85
Nickel	Ni^{58}	35.31	68.08
	Ni^{60}	32.41	26.23
	Ni^{61}	ND	1.14
	Ni^{62}	32.28	3.63

Other Tests Performed

Samples W-1 and W-6 were placed on a flat surface, and a pendulum, constructed from a 4 oz lead weight tied to an 18” long piece of monofilament nylon line was passed over the samples. When the weight passed over the samples at close range (< 2”) the weight consistently showed a noticeable deflection away from the sample.

These results are similar to those obtained from a similar test done on all six samples by Chuck Wade at the 2010 UFO Congress, in Laughlin, NV.

Discussion

Appearance and Physical Characteristics of Samples

The samples are composed of aluminum alloy sheet, some of which are coated with what appears to be a protective coating. The samples had some soil attached when first received, and had clearly been buried at one time

The corrugations on W-2, W-3, W-4, and W-5 are reminiscent of the type of bending which can occur from sudden shock, as in an aircraft crash, although it cannot be ruled out that the samples could have been manufactured in this form.

The samples were composed aluminum alloys, all having a low content of copper, and with unusual alloying/trace elements, many of which were unheard of as components of aluminum alloys in 1947, and are unlikely to have been introduced during the aluminum manufacturing process in that era.

These facts are consistent with the material being debris from the crash of an aircraft, or spacecraft at the San Augustine desert location. If the crash did occur in 1947, the material seems inconsistent with the materials that were commercially available at that time, and are possibly too advanced to have been produced by the technology of that time period.

The mechanical strength of the materials is not extraordinary, however, and seems well within the normal limits of the strength of commercially available aluminum alloys. The materials could all be bent, torn, and cut with relative ease.

It is not known where these samples came from in the structure of the craft, however, and it is possible that they came from interior structures, which did not require extreme mechanical strength. If this is the case, then samples from the exterior of the craft may show much more mechanical strength and toughness.

The layer of ceramic-like material, seen on some of the samples (W-2, W-3, and W-6) under light microscopy, is interesting, and appears to be some type of protective layer placed over the metal. This type of technology was probably not available in 1947.

One of the materials (sample W-6) also appeared to have a layered structure, which is not typical of commercial aluminum alloys.

The SEM images of the materials also show surface coatings on the samples, which appear to be applied, and are not the simple aluminum oxide surface layer which forms naturally on standard aluminum alloys. These coatings have pits, and pores of somewhat regular composition. There are also particles on the surface which EDX indicated have different composition from the remainder of the coating.

The layered structure of sample W-6 is also very apparent in the SEM images. This type of structure is not seen in aluminum alloys, and is more reminiscent of the structure seem in some titanium alloys, or a more complex material, applied in layers by chemical vapor deposition, or some similar technique.

The EDX area data confirmed that there is a coating on some of the samples, which differs significantly in composition from that of the metallic phase, and contains many elements not found in the metal.

EDX mapping and point-and-shoot data confirmed that the coatings are not homogeneous, and contain particles with different elemental composition than the rest of the coating. These coating particles contain increased amounts of oxygen, silicon, potassium, calcium, and carbon.

The large array of elements detected in the samples by the ICP-MS testing is an indication that these are very complex aluminum alloys, which contain unusual alloying elements, and are unlike typical aircraft aluminum alloys which were available in 1947.

The presence of relatively large amounts of iron, calcium, silicon, zinc, relative to what is usually present in aircraft aluminum alloy, appears to indicate that the alloys may have been intended for an application requiring good electrical conductivity, as these elements do not decrease the electrical conductivity of aluminum as much as most other common alloying elements.

The rare earth metals may have been added to the alloy to strengthen the material, as a large amount of research has been done in recent years on the use of these elements to strengthen aluminum alloys.

The results of the isotopic analysis of the ICP-MS results from sample W-1 indicate that the isotopic abundances of each of the elements tested (antimony (Sb), copper (Cu), and nickel (Ni)) differed significantly from the isotopic composition of the same elements derived from terrestrial sources.

For elements heavier than boron, differences in isotopic composition of more than approximately 1% from the usual terrestrial isotopic abundance pattern, indicates a high probability that the material originated from a non-terrestrial source.

All of the elements tested differed from the terrestrial abundances by much more than this. These elements in sample W-1 therefore may not have originated on Earth. A dedicated isotopic analysis should be done on this sample to confirm this conclusion.

The Raman data, indicating the possible presence of carbon nanotubes in sample W-1 was very intriguing. These materials were discovered in 1991, have unique mechanical and electrical properties, and are currently an active area of investigation in Materials Science. Carbon nanotubes are being investigated to strengthen metals, and create embedded electronic components.

These potential uses for carbon nanotubes result raises the possibility of the samples being advanced "smart metal" materials, containing carbon nanotube electronics. The results of the pendulum test indicate that the tested samples may be emitting an electromagnetic, or gravitational field, which supports this hypothesis. Gaussmeter testing should be done on these samples to investigate whether a magnetic field is present.

Conclusions

1) These samples contain very unusual alloying elements which were not present in aluminum alloys in 1947. If these samples are from an aircraft which crashed in that year, they are very unusual on that basis.

2) The coatings on the samples are also unusual because conformal coatings of this type, which are blended with the metal, and rich in silica, titania, magnesia, sulfate, phosphate, and chloride, were almost certainly not available in 1947. The coatings on the samples are also somewhat similar to coatings on implants removed from people claiming alien contact.

3) The carbon nanotube indications observed in the Raman spectra of the samples indicates the possibility that the samples may be "smart metal" materials, which contain carbon nanotubes as electronic components, or to strengthen the materials. Since the mechanical strength of these samples was not unusual, they should be tested for unusual electrical characteristics.

4) The isotopic ratios of three elements in sample W-1 (antimony, copper, and nickel) were extremely skewed, with respect to the terrestrial ratios for these elements, and there is therefore a high probability that the samples came from an extraterrestrial source. These extremely skewed isotopic results are again reminiscent of those obtained from alleged alien implants, and from an alleged piece of the Roswell crash debris which was analyzed by the late Dr. Russell VernonClark (see appendix).

5) The results of the pendulum test indicate that samples W-1 and W-6 may still be emitting gravitational, or magnetic energy, which greatly increases the probability these samples are nanotechnological "smart metals" and of probable alien origin as well.

6) Further microscopic testing should be done on these materials to determine their internal structures. More testing should also be done to determine the existence, extent, and profile of any gravitational, magnetic, or electric fields the samples may be emitting, and their source of energy.

Appendix

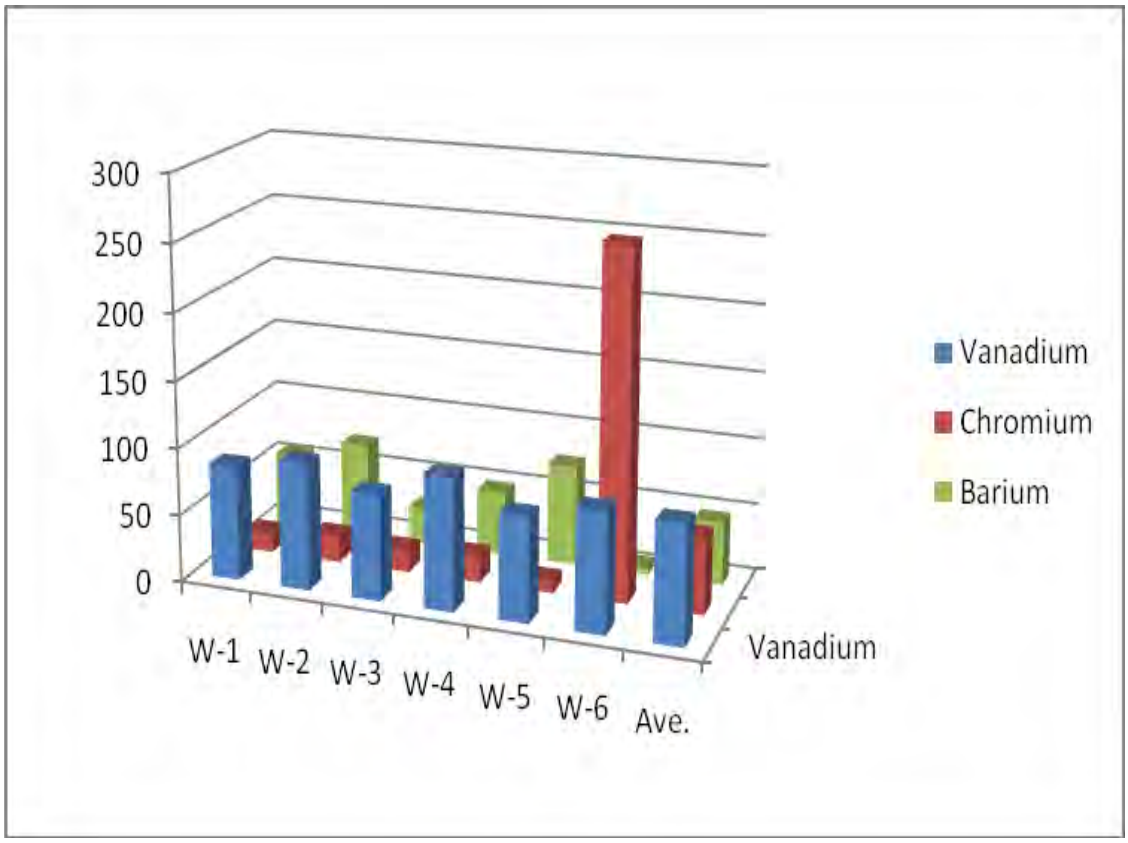


Figure 28- Amounts of V, Cr, and Ba in each Sample-in parts per million (ppm)

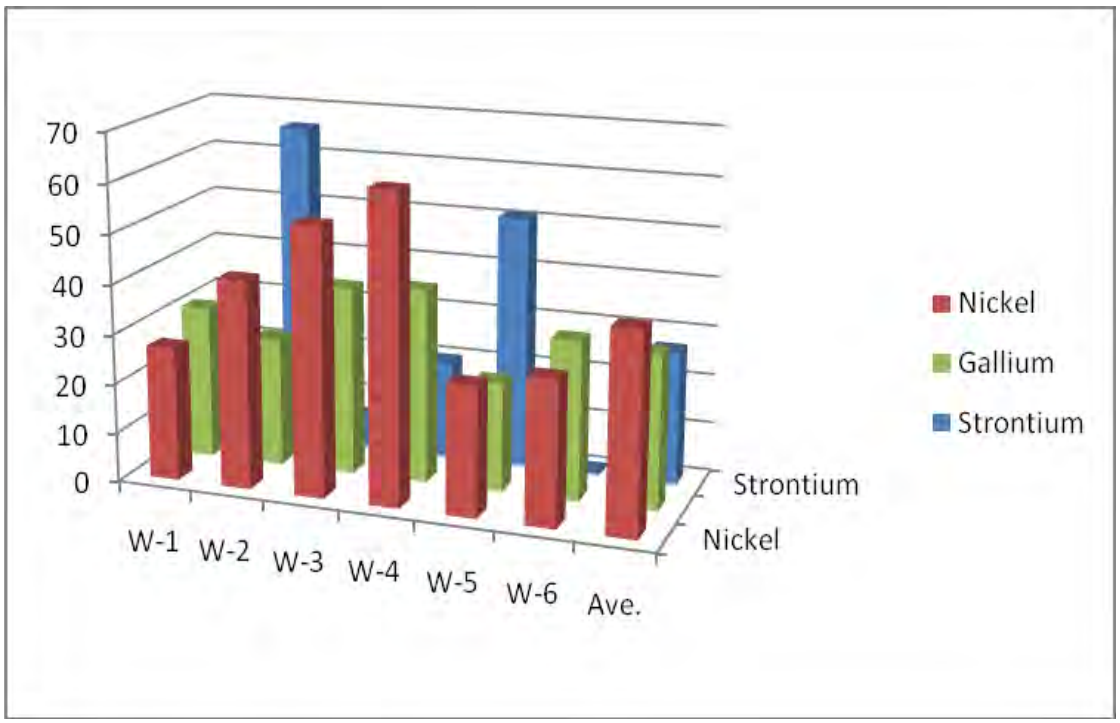


Figure 29- Amounts of Ni, Ga, and Sr in each Sample-in parts per million (ppm)

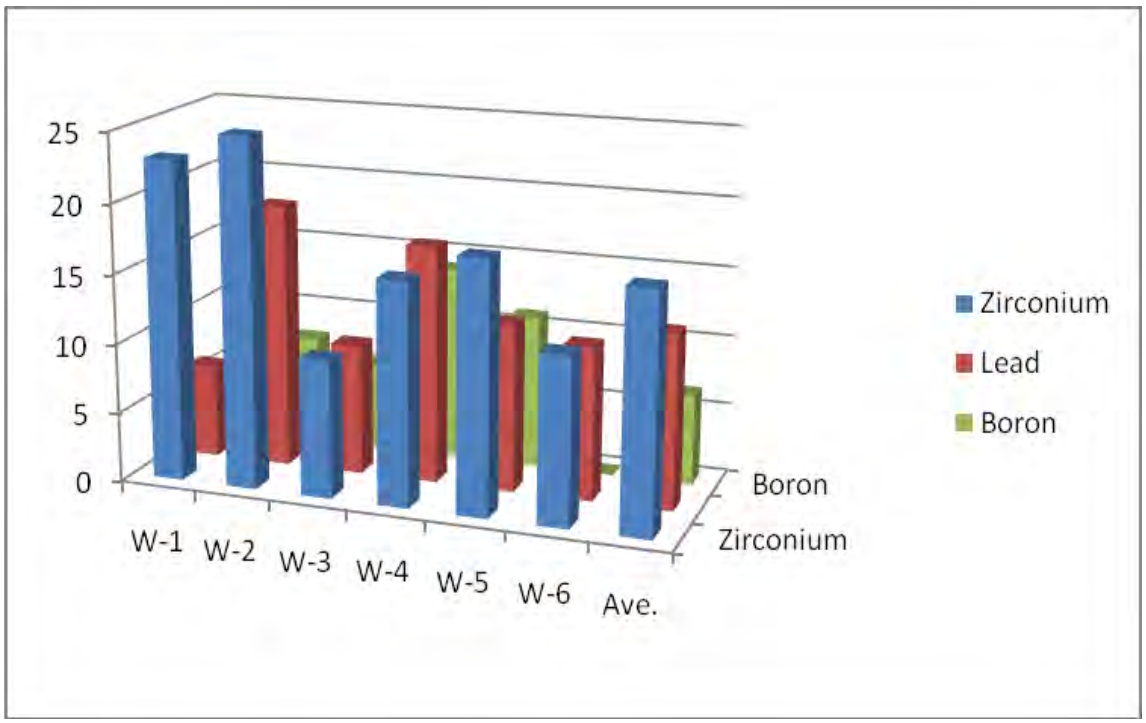


Figure 30- Amounts of Zr, Pb, and B in each Sample-in parts per million (ppm)

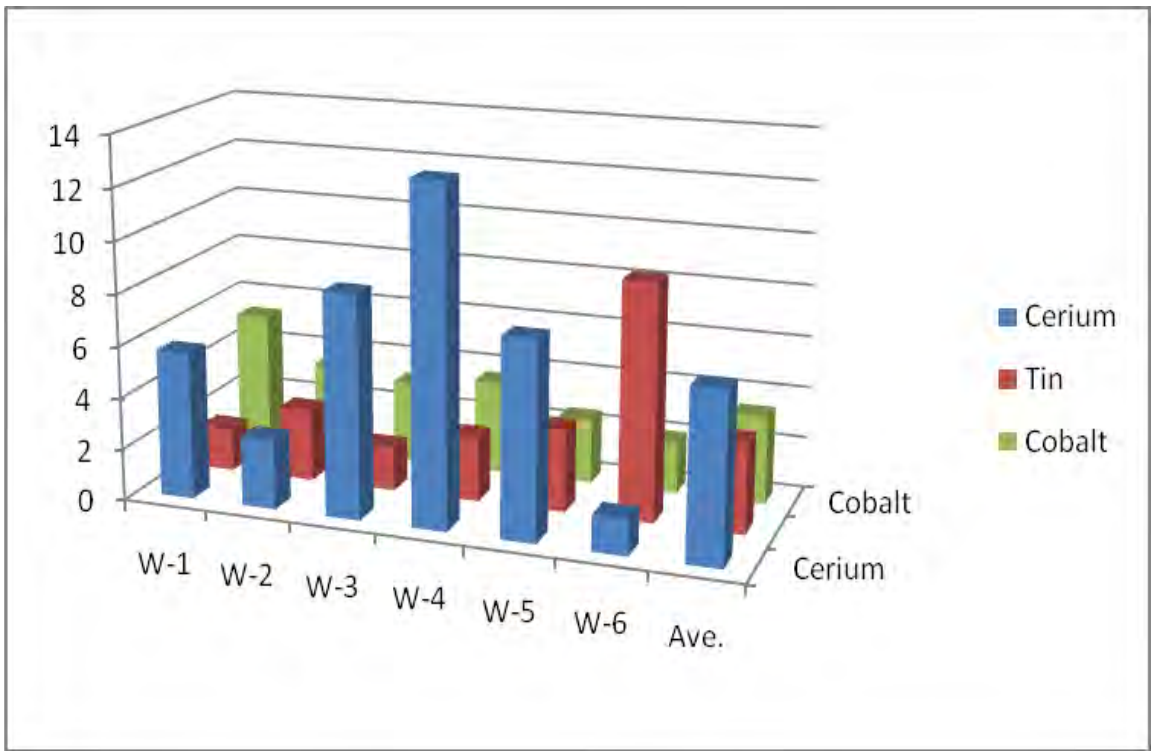


Figure 31- Amounts of Ce, Sn, and Co in each Sample-in parts per million (ppm)

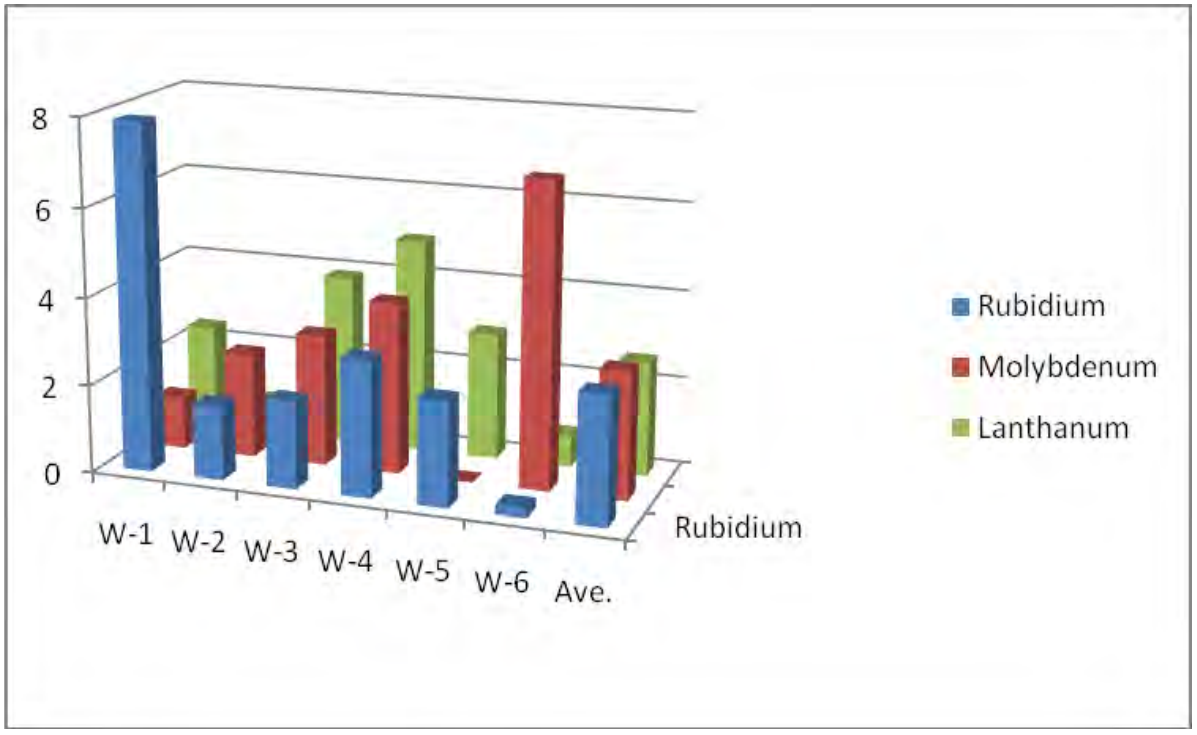


Figure 32- Amounts of Rb, Mo, and La in each Sample-in parts per million (ppm)

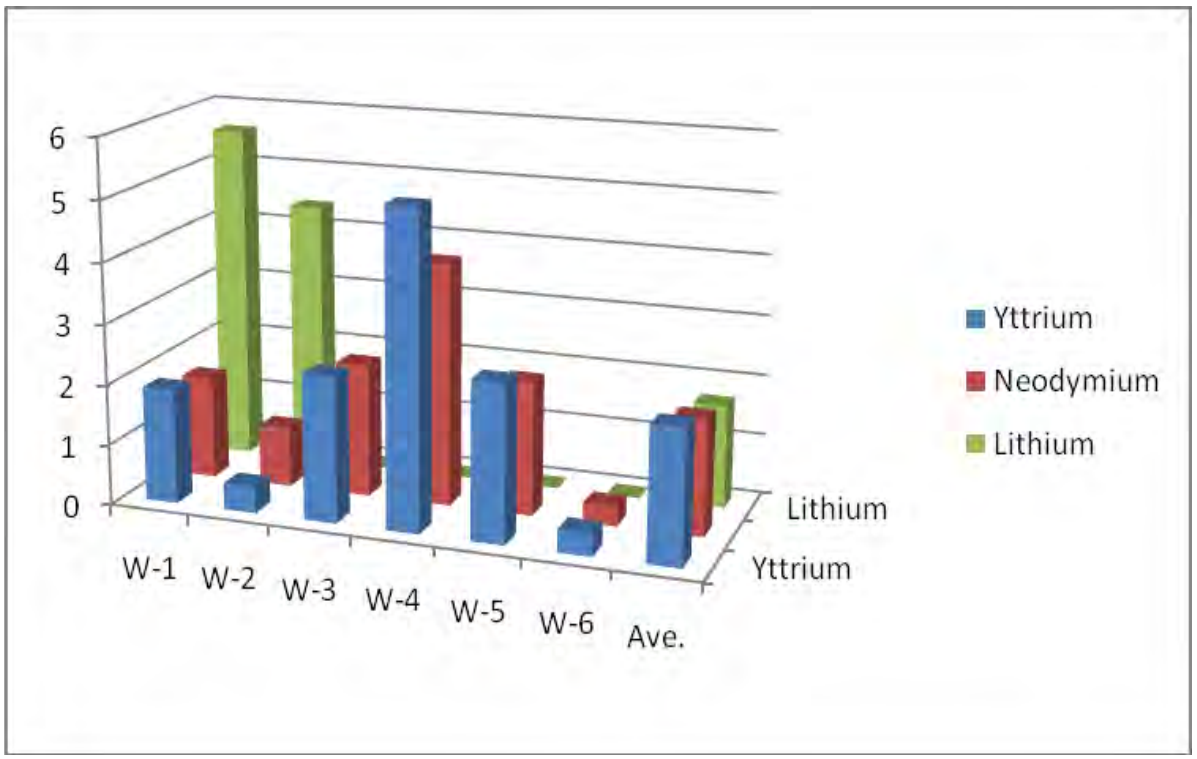


Figure 33- Amounts of Y, Nd, and L in each Sample-in parts per million (ppm)

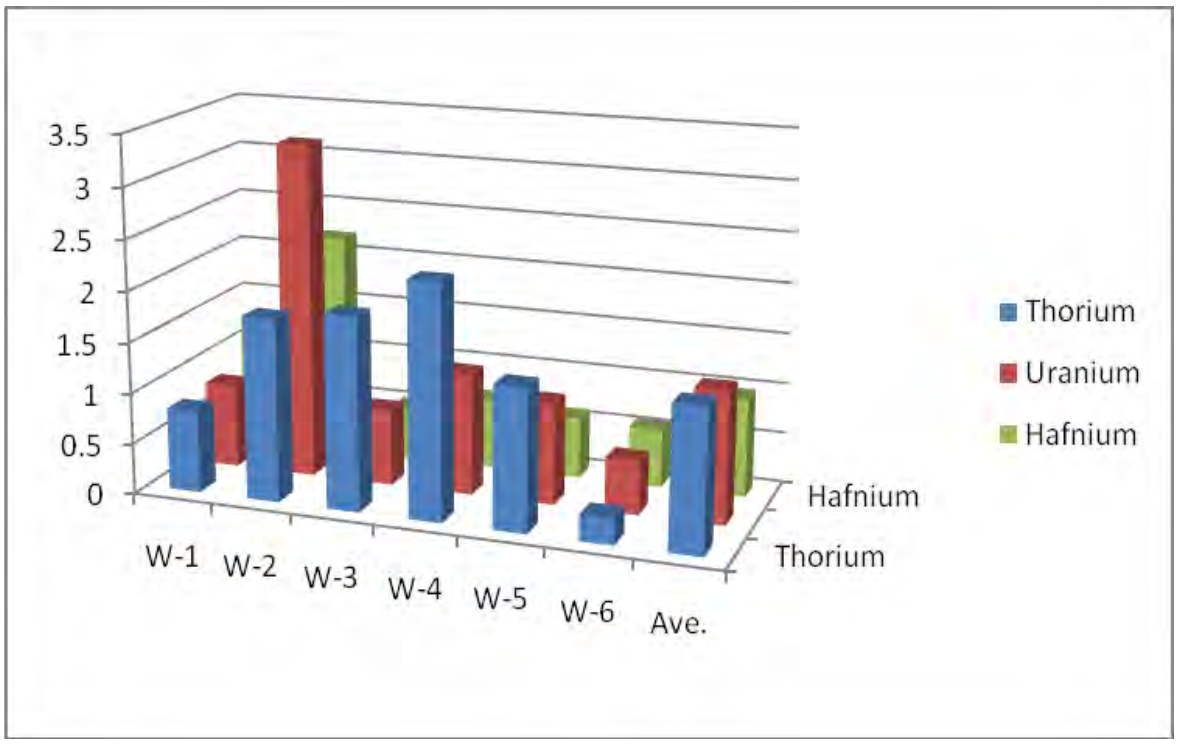


Figure 34- Amounts of Th, U, and Hf in each Sample-in parts per million (ppm)

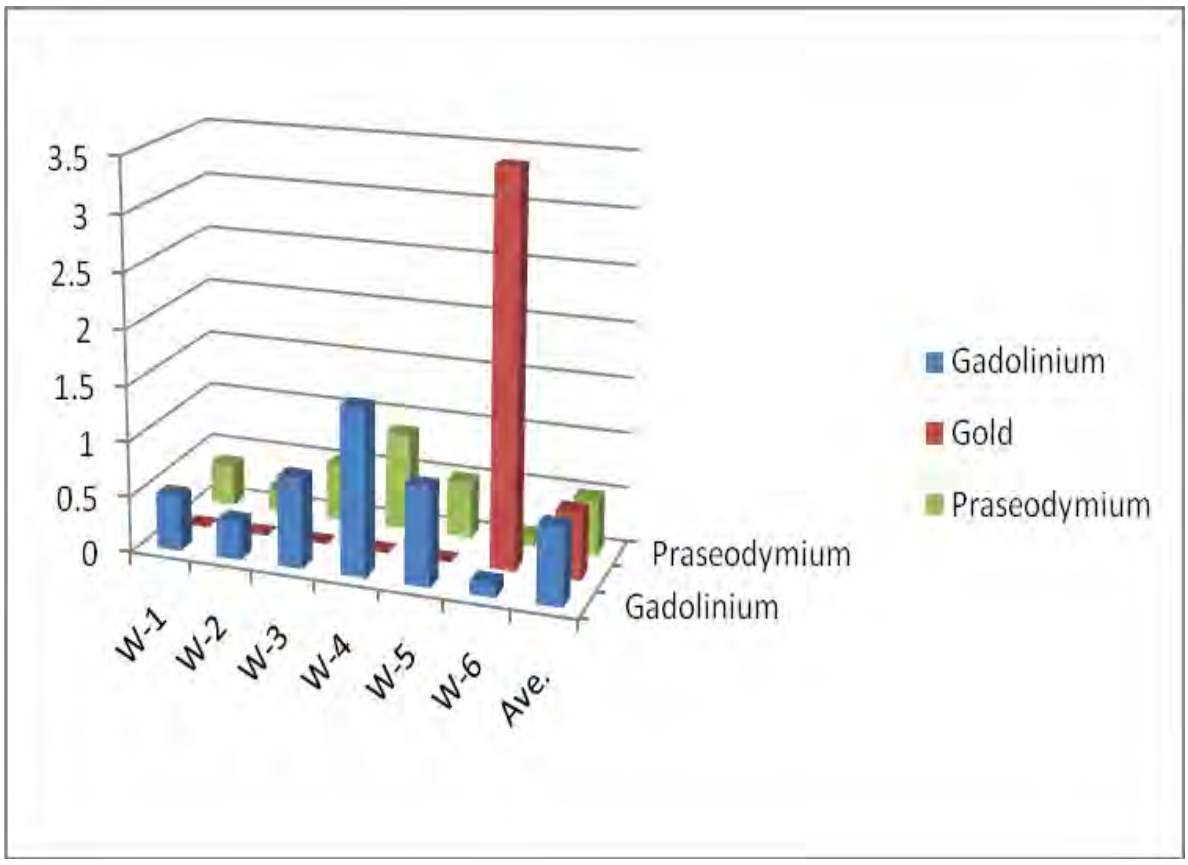


Figure 35- Amounts of Gd, Au, and Pr in each Sample-in parts per million (ppm)

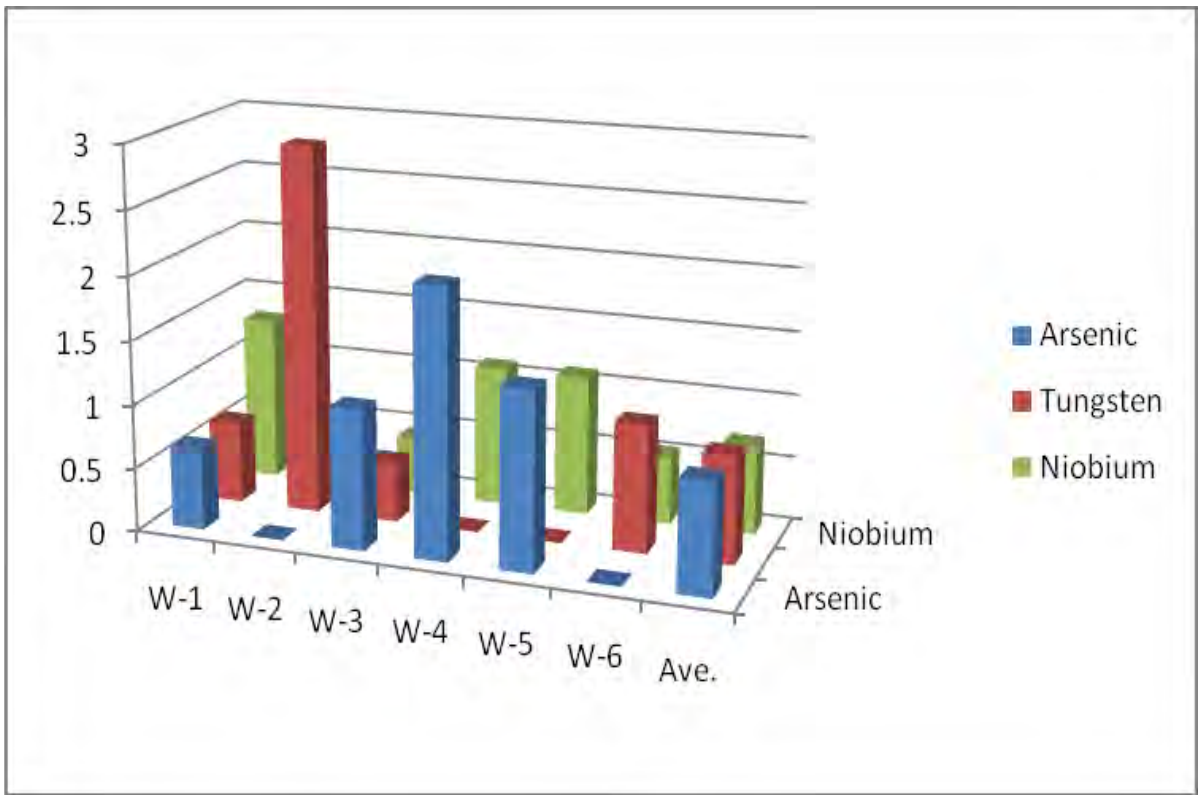


Figure 36- Amounts of As, W, and Nb in each Sample-in parts per million (ppm)

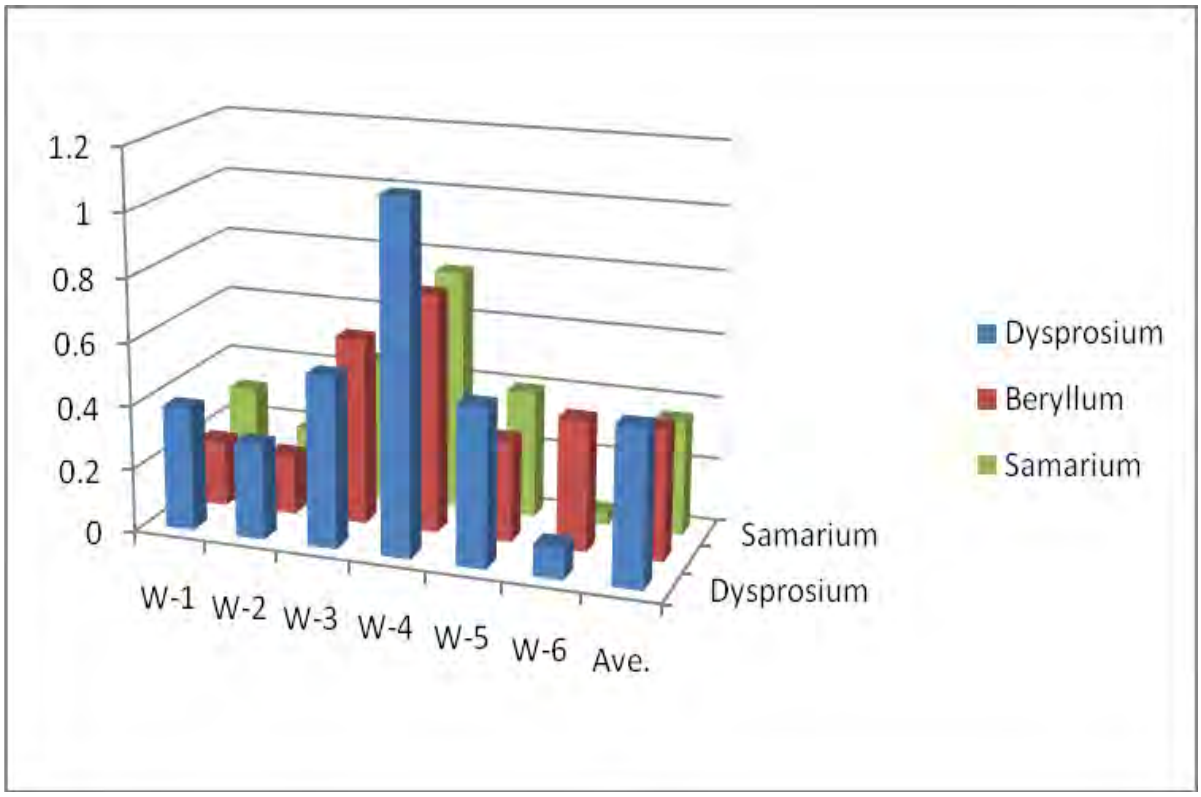


Figure 37- Amounts of Dy, Be, and Sm in each Sample-in parts per million (ppm)

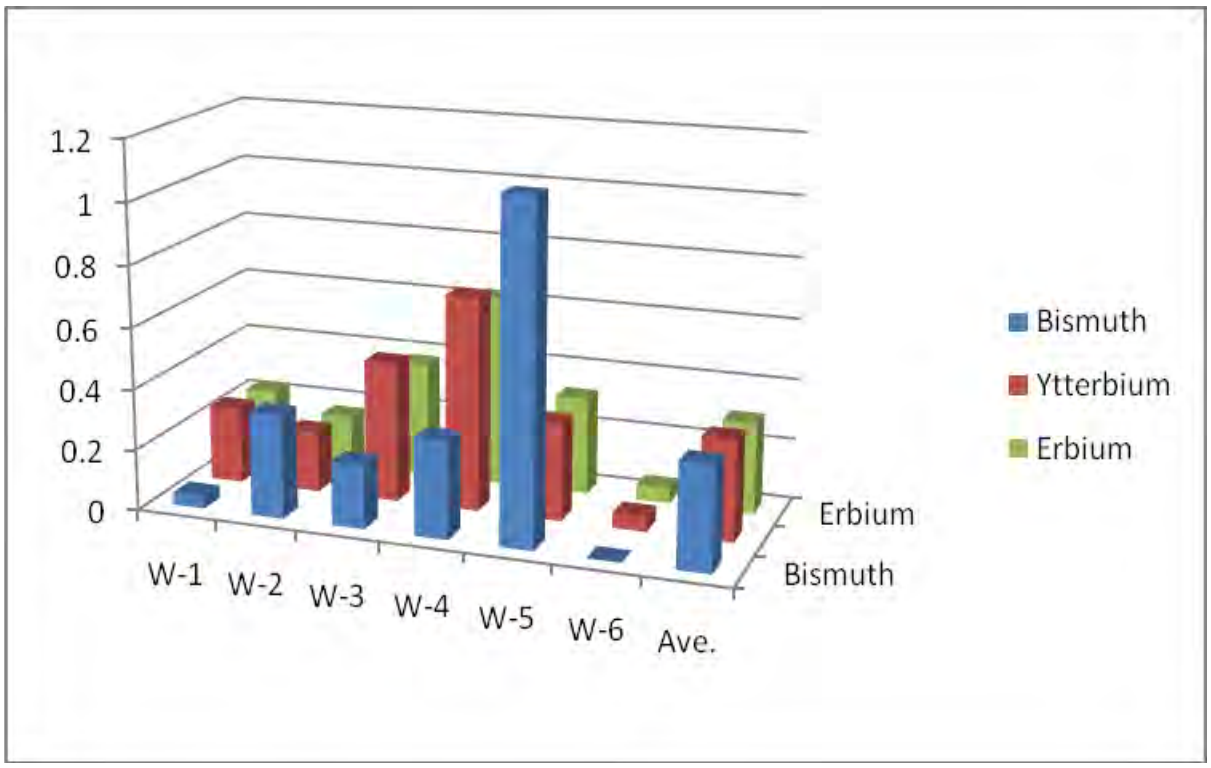


Figure 38- Amounts of Bi, Yb, and Er in each Sample-in parts per million (ppm)

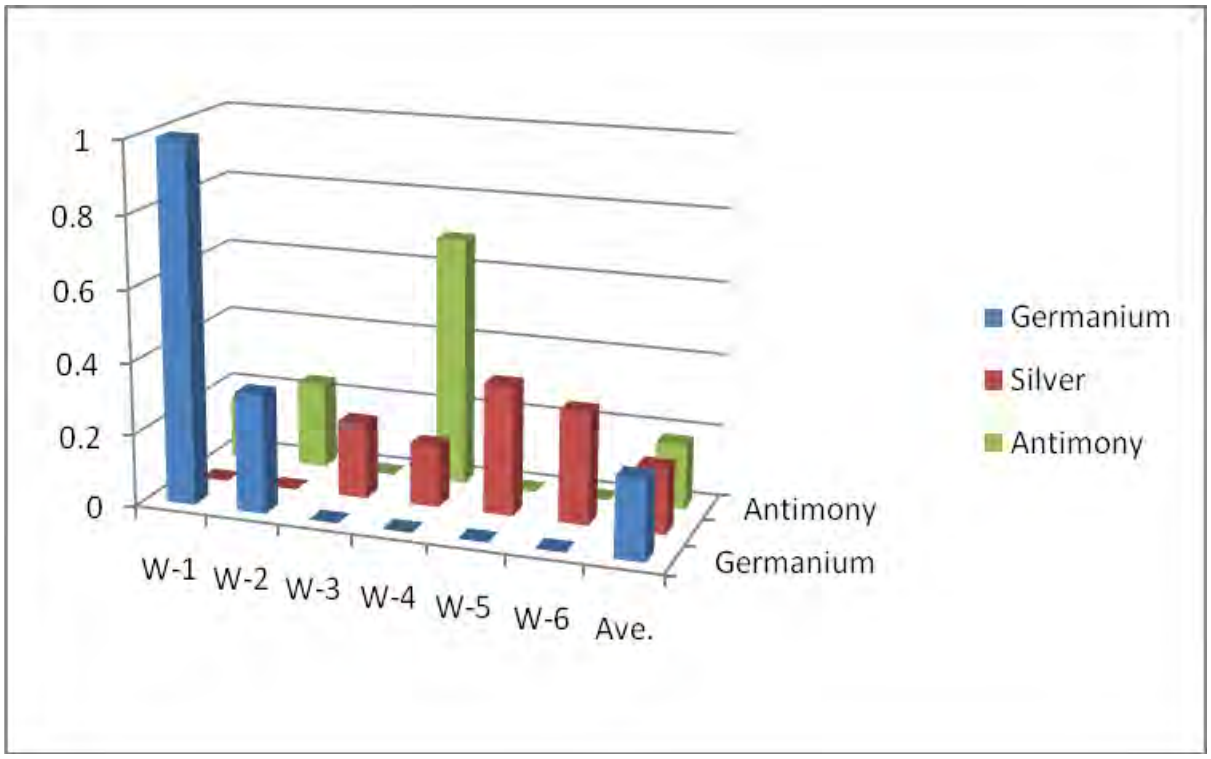


Figure 39- Amounts of Ge, Ag, and Sb in each Sample-in parts per million (ppm)

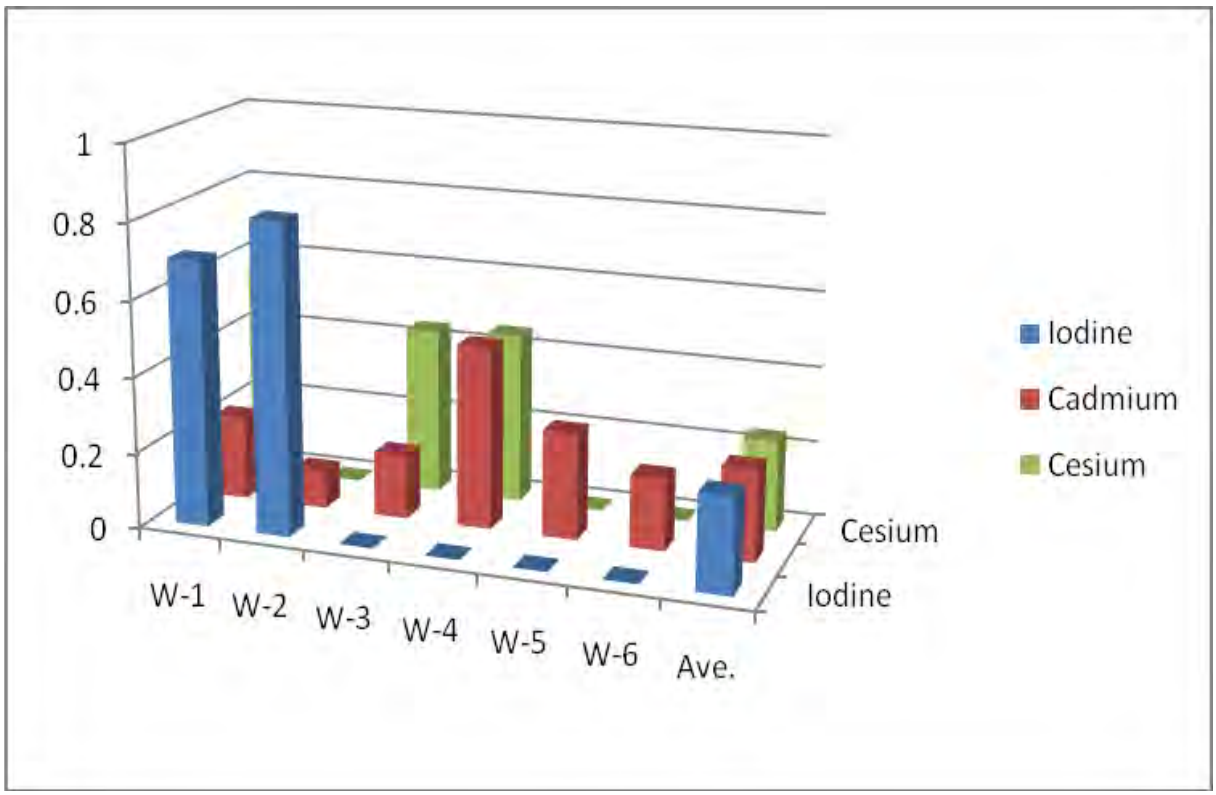


Figure 40- Amounts of I, Cd, and Cs in each Sample-in parts per million (ppm)

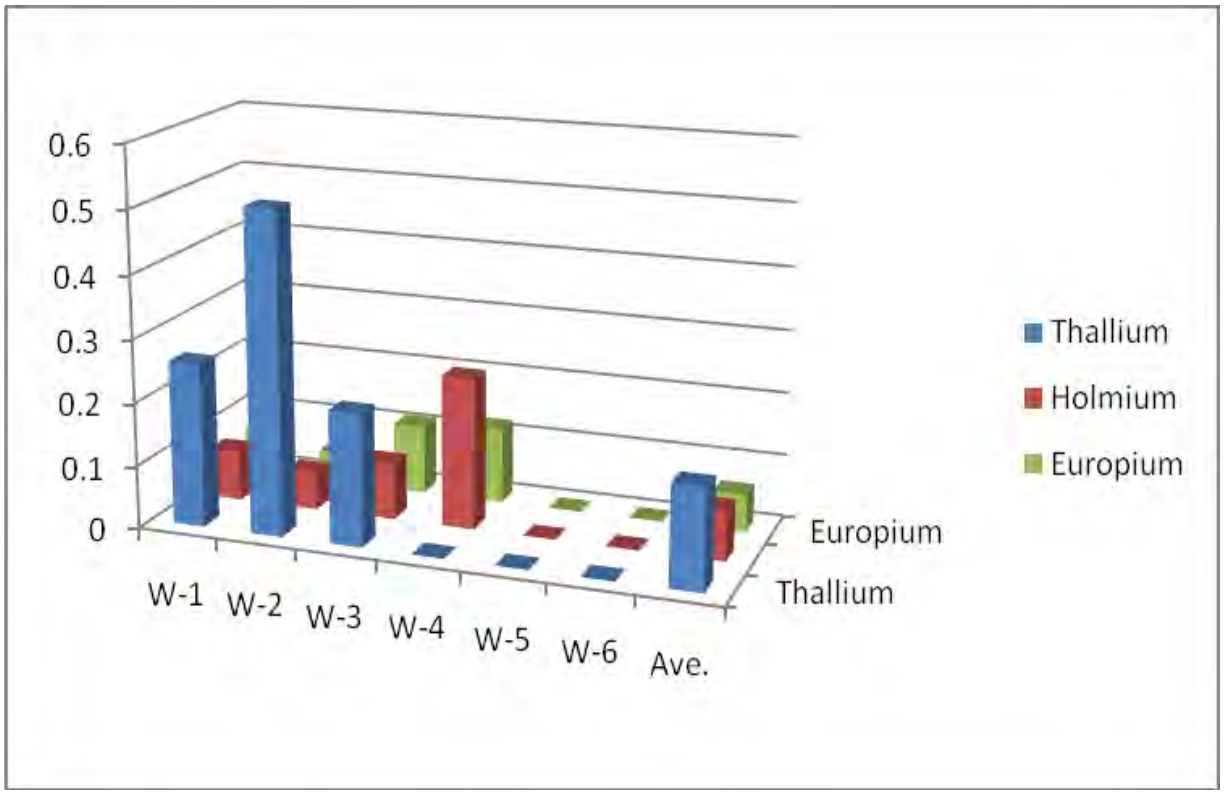


Figure 41- Amounts of Tl, Ho, and Eu in each Sample-in parts per million (ppm)

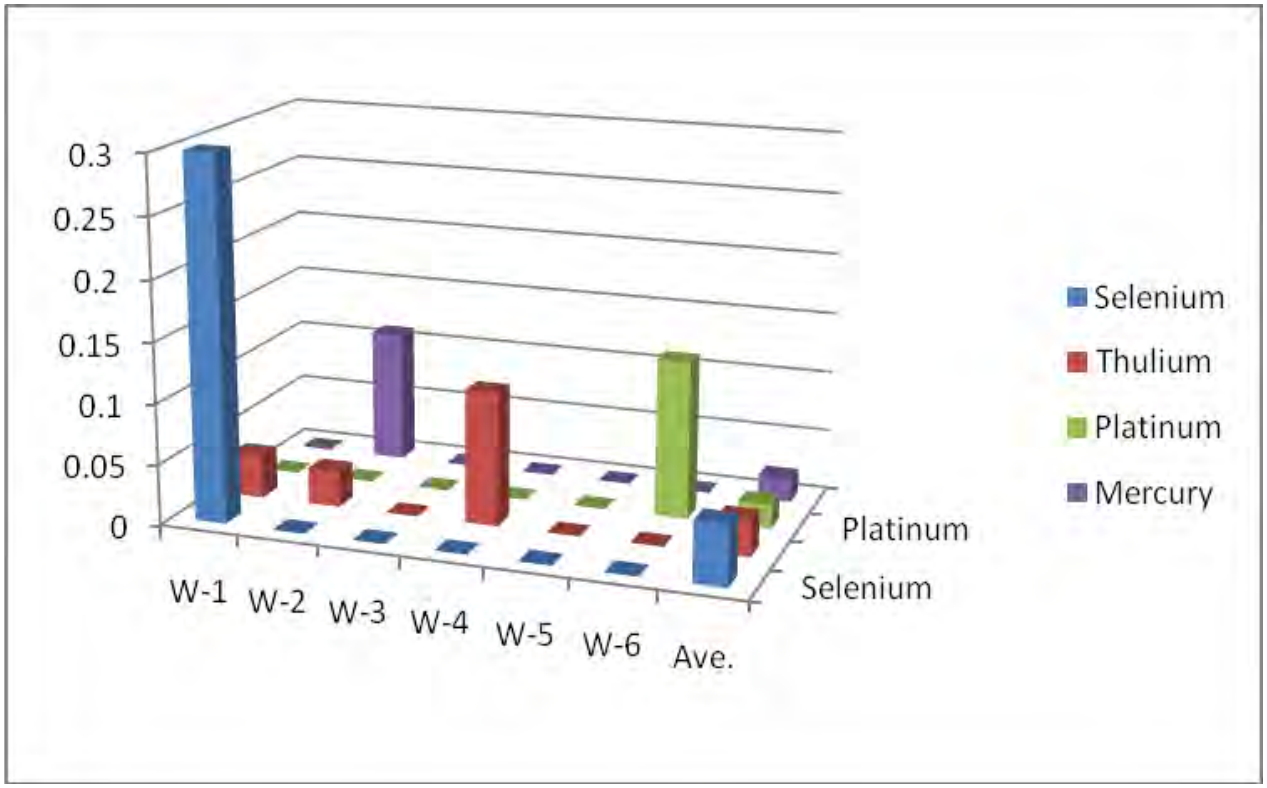


Figure 42- Amounts of Se, Tm, Pt, and Hg in each Sample-in parts per million (ppm)