POSSIBLE ORIGIN OF THE VEAS-01 IRON ROCK

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Rodolfo Novakovic
Brian Townley

1.- INTRODUCTION

In October 2003, under the Chilean legal framework of the territorial Mining Code, a more than six tons iron rock was removed from the township of “San Joaquin”, Santiago, Chile. Knowledge of this rock dates back to before 1918, and people believe it was around that very place al least 150 years before. During the 18th century, and after 1767, the area in which the Veas-01 iron rock was located was a farm land called “La Ollería” and belonged to a Jesuit religious community. Three Bavarian Jesuits, two priests and one friar, were in charge of the “Chacrilla La Ollería”, where they held a metal working factory in which iron was processed as well as other metals: Peter Waingartner, Joseph Arnalt, and Joseph Ambroz. Before them, in Chile, nobody possessed the knowledge on how to produce pure iron or even steel. After their arrival (August 1767) and after King Carlos III of Spain expelled the Jesuits out of the kingdom and until present day, there is no evidence nor historical document of existence of a blast furnace or any similar technology to produce iron or even to reuse any sort of steel in the area of “La Ollería”.

Although the Veas-01 rock shows some potentially extraterrestrial properties, two perfectly rectangular holes (22 x 5.5 cms) indicate human intervention at temperatures up to 2500º C. As it will be described later in this document, despite the fact that the Veas-01 rock is mainly made out of pure iron, the metal itself does not melt at a temperature of 1515º C as common iron does. Only partial melting was accomplished at very high and unusual temperatures.

Including the Veas-01 Rock, in 1767 three unusual objects existed in these farmlands that belonged to Jesuit Order:

(1) An Electric Machine of unknown type, acquired probably before 1765 and registered in inventory by the substitute minister Juan Antonio Archimbano, in substitution of the head minister Juan de Balmaceda. The Electric Machine, probably brought from Leyden (Holland) or from Germany, was found by Mr. Archimbano on august 26, 1767, in the farm known as “Calera de Tango”. Since that time this machine’s history was lost (Archivo Nacional de Santiago, Fondo Jesuitas, Vol 7, fs. 371). The first officially registered electric machine in Spain was authorized by King Carlos III in 1770 (Carles Puig-Pla, Royal Academy of Science Barcelona), five years after the acquisition of an electric machine by the Jesuits in Chile.

(2) A Chalice of heavy metal, probably some sort of steel, covered in silver, which was stolen from “Museo de La Catedral” in 1982. The Chalice was forged for 19 years, between 1748 and 1767, in the “Calera de Tango” farm by a priest from Leyden (Holland). (Documentos Caliz de Calera de Tango, Museo de la Catedral, 1982).

(3) The Veas-01 and its rectangular orifices, found at the place which was known as the “La Ollería” farm. No documents exist to demonstrate this fact, but this topic will be discussed later in this document.

2..- THE VEAS-01 IRON ROCK

Initial studies of this Rock indicated a high iron content, purity in the range of 98.55 to 99.15 wt%, with a low C content, below 0.1 wt%. These characteristics, comparable to present time low C alloy steels, require blast furnace technology for their making. Although there are some characteristics proper of siderite type meteorites, low Ni contents argue against such a classification. Leucite or a Leucitoid minerals have been reported for some melt crust samples surrounding one of the rectangular orifices. Not commonly present in meteorites, it has been thought that Leucite might have occurred as secondary crystallization from Maskelynite after the shock event when the rock struck the Earth's surface.

Despite the fact that this well known 6170 kilograms Big Iron Rock was intriguing, no town council or any other Chilean government agency, including "The Council of National Monuments" or the Chilean Geological Survey ever ventured in the study of this rock. Because Mr. Jorge Veas was the first person to give any serious research efforts to this rock, it was named as VEAS-01.

Since our goal is to explore a possible origin of this Iron Rock, we will separately examine each part of the rock, first the outer melt crust considering our most recent report made by the geologist, Dr. Brian K. Townley, and afterward a brief summary of the iron from which the Rock is made.

The report summarized below was made by the geologist Dr. Brian Townley at the Department of Geology from University of Chile, and presents a personal data review of a micropetrographic, SEM and microprobe study of selected samples of the Veas-01 Iron Rock, together with results of other analysis reported independently in the past years. Dr. Townley also included data results of an oxygen isotope study carried out on melt crust samples, at the Department of geology, Queen's University at Kingston, Ontario. This rock, of yet uncertain origin, has been center of research efforts by Carlos Hidalgo & Asociados group, with minor collaboration on part of Brian Townley. All research expenses have been incurred by Carlos Hidalgo & Asociados group. Samples for micropetrographic and isotopic study were personally taken by Dr. Townley from the Veas-01 Iron Rock in company of Rodolfo Novakovic and Carlos Hidalgo.

2.1.- SECTIONS OF VEAS-01

The Veas-01 Iron Rock consists mostly of iron, with an outer melt crust and many inclusions of silicate rocks. The rock itself weighs approximately 6.2 metric tons, measuring some 2.5 by 2 by 1.5 meters. The Rock is strongly magnetic, this property having been measured by the Physicist Engineer Mr. Jorge Reyes Molina and by Dr. Townley. The Big Iron Rock presents two well defined sections of differing characteristics summarized below:

(1) An outer thin melt crust which surrounds almost half the total rock surface. This crust varies from one point to another, well developed and about 5 – 8 mm thick on one side (from which samples were taken), and very thin and poorly developed on the other side. In some parts the crusts looks dark and glassy, in others it looks slightly granular,

and in other parts granular, with macroscopic iron sulphides (troilite, pyrrotite or pyrite) or magnetite. A sample of the slightly granular crust indicates a quartz subsaturated mineralogy consistent of millimeter sized olivine, pyroxenes, iron-magnesium-(chromium) spinel, leucite or leucitoid mineral, possible melilite and minor undetermined calcium-aluminum inclusions which show an iron-rich portion exsolved from an iron-poor potasium-rich portion. A sample from the dark glassy crust presents millimeter sized chromites and olivines (fayalite-monticellite) in a matrix of smaller chromites and olivines and lesser iron oxides. The thin melt crust in parts presents considerable development of brecciate fragmented rocks in a metal and iddingsite matrix. An oxygen isotope analysis from a whole rock sample and from a monticellite/melilite crystal yielded results that on a δ^{17}O versus δ^{18}O plot do not fit exactly on the terrestrial fractionation line (TFL), even within error margin, but slightly below. The crust mineralogy shows many characteristics that are comparable to Chondrite Group meteorites. The melt crust represents no more than 3 wt% of the total rock.

(2) An inner iron-rich matrix which represents 97% of the rock, consisting of pure iron with a low Ni (average 0.20 wt%) content, and some inclusions commonly found in meteorites such as Troilite, Niningerite and Chromite (among others). An inclusion which so far has not been reported for iron-meteorites was found in the Veas-01 iron rock, an iron manganese sulphide (Fe,Mn)S, indicative of very high formation pressure (verbal comm., Dr. Jorge Garín, metallurgy, University of Santiago).

2.2.- INSIGHT ON OUTER MELT CRUST

Two thin polished sections of the outer melt crust were studied, and one additional crust sample was sent to Queen's University for an oxygen isotope study. Thin polished sections were prepared and studied at the Department of Geology, University of Chile.

2.2.1.- Microscopic Studies

Two outer melt crust samples were taken from the Veas-01, sample labeled as Oliv01 and Oliv02. Melt crust on the rock varies from one point to the other, well developed and about 5 – 8 mm thick on one side (from which samples were taken), and very thin and poorly developed on the other side. In some parts crust looks dark and glassy (sample Oliv02), in other parts it looks slightly granular (sample Oliv01), and in other parts granular, with macroscopic iron sulfides (perhaps troilite, pyrrotite or pyrite) or magnetite.

Sample Oliv01 consists of millimeter sized olivine, melilite and pyroxenes in an equigranular texture, with abundant smaller opaque minerals (iron oxides, chromites and sulfides) and leucite fillings. Minor alteration to chlorite is observed along crystal contacts and fillings, particularly piroxenes. A portion of this sample, analyzed by X-ray diffraction at Universidad de Santiago (USACH), indicated fayalite (iron silicate gamma) and monticellite as the olivines, together with quartz and goethite (Garin, 2005). Figure 1 shows micropetrographic photos of the main mineral association.

Sample Oliv02 consists of millimeter sized chromites and olivines (monticellite) in a ground mass of smaller crystalline olivines (monticellite-fayalite). Smaller opaque minerals comprise iron oxides and chromites. Figure 2 shows micropetrographic photos of the main mineral association.

Both samples present effects of weathering, in particular oxidation of iron and of chromites, which makes direct petrographic identification of minerals somewhat difficult. For better identification, microprobe analyses were carried out on the same samples. In the sample sent to Queen’s University, melilite was reported in addition to monticellite, only suspected in sample Oliv02 (Fig.2).

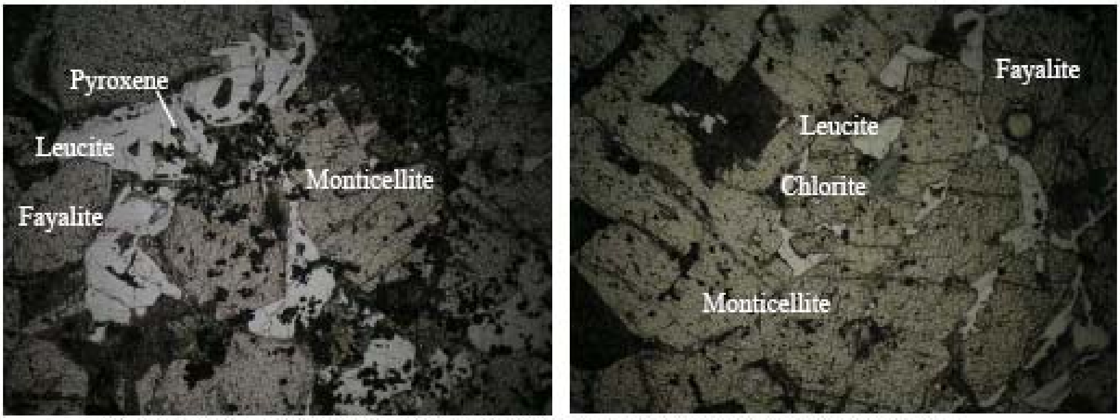


Figure 1. Micropetrographic photographs of sample Oliv01. a) Monticellite, fayalite, hedenbergitic pyroxene, leucite and opaques, among them pyrite, iron and cromium oxides, with lesser alteration chlorite. b) Monticellite, fayalite, leucite, chlorite and lesser opaques, iron and cromium oxides.

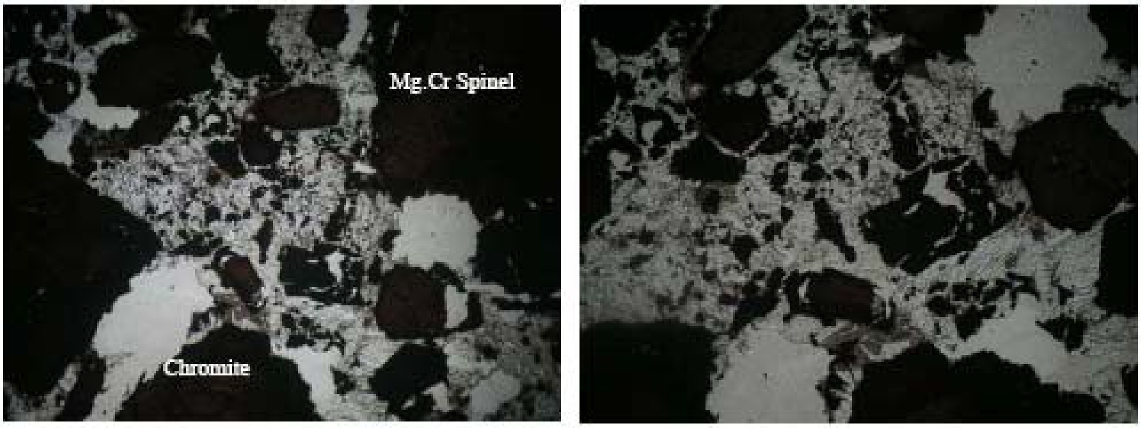


Figure 2. Micropetrographic photographs of sample Oliv02. a) Chromite and Mg.Cr spinel (up to 7 mm) in a monticellite – mellilite (?) – leucite matrix. b) detail of matrix.

2.2.2.- SEM and Microprobe Analysis

A total of two samples from the outer melt crust were analyzed, data which was presented in a previous report. Results are here summarized for discussion purposes. Micropetrographic studies of samples Oliv01 and Oliv02 indicate a silicate and oxide mineralogy (olivine, pyroxene, leucite and chromites) as shown in figure 2.

Microprobe analysis for sample Oliv01 indicates the following mineralogy: fayalite, hedenbergite (or hastingsite or essenite), leucite and possibly ringwoodite. Some secondary alteration chlorite occurs between olivine crystals, as well as iddingsite-boulingite. Sample Oliv02 shows the following mineralogy: iron-magnesium-(chromium) spinels, from magnesium-rich to iron-rich, intergrown with iron-magnesium olivines, with rounded inclusions of unknown minerals. These present a fishbone-like texture of light and dark colored minerals (Fig. 3). Microprobe analysis show two differing minerals and undetermined aluminosilicates, a light colored Fe-Ca-Ti-Mg aluminosilicate in a dark colored Ca-K-Fe-Na aluminosilicate (Fig. 3). The light colored mineral is iron-rich, the dark not, but both have high calcium and aluminium, relative to other minerals of the melt crust.

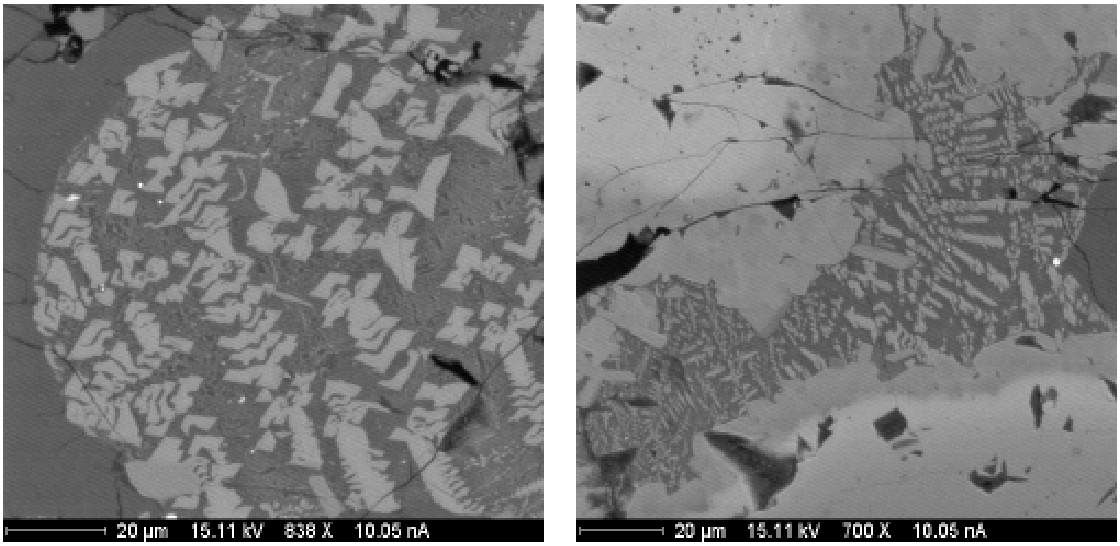


Figure 3. Fishbone – like texture of aluminosilicates. Light color is Fe (32%) – Ca (12%) – Ti (5.7%) – Mg (2.6%) – rich. Dark color is Ca (7.7%) – K (7.3%) – Fe (6.7%) – Na (4.4%) – rich.

In summary, melt crust samples have a quartz subsaturated mineralogy consistent of millimeter sized olivines, pyroxenes, iron-magnesium-(chromites) spinel, leucite, melilite, and minor undetermined calcium-aluminum inclusions (iron-rich exsolved with iron-poor potasium-rich; Fig. 3).

2.2.3.- Oxygen Isotope Analysis

One sample of the Veas-0 Iron Rock crust was sent to the Department of Geology, Queen's University, in October 2005. The sample was taken personally by Dr. Townley from the rock. Two analisis were reported from Queen's, one analysis on what is thought melilite, and one on a whole rock subsample. Results are presented as follow:

Subsample	$\delta^{17}O$ (SMOW)	$\delta^{18}O$ (SMOW)
Whole Rock (WR)	6.0 ± 0.2	12.0 ± 0.2
Melilite	7.8 ± 0.2	15.7 ± 0.2

A brief report from Queen's indicated that all terrestrial and moon samples have a $\delta^{17}O = 0.52 \times \delta^{18}O$ and most extraterrestrial samples do not, having excess or depletions on 17-O. These samples plot right on the terrestrial fractionation line (error is ± 0.2) and are very unlikely to be of extraterrestrial origin. Moreover, high $\delta^{18}O$ values indicate they have seen water enriched on $\delta^{18}O$ (metamorphic) or have been altered at low temperatures.

Nevertheless, closer examination of data and plotting, compared to the terrestrial fractionation line (as described above), show that even within error margin these samples do not fall on the line, they occur slightly below (Fig. 4). The whole rock subsample falls closest to the line, whereas the melilite subsample deviates from the TFL. Error bars for both do not intercept the fractionation line (Fig. 4).

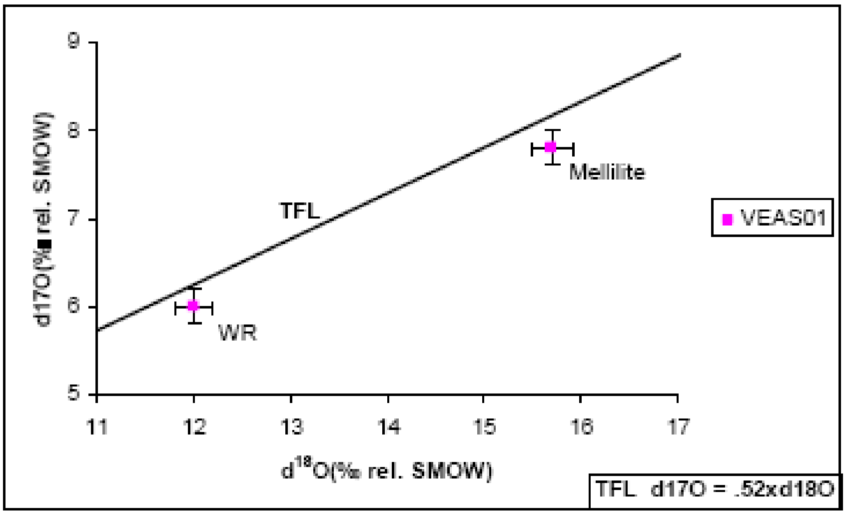


Figure 4. Plot of $\delta^{17}O$‰ (SMOW) against $\delta^{18}O$‰ (SMOW) for whole rock and mellilite subsamples from the rock crust sample of the VEAS 01 Iron Rock. Terrestrial fractionation line (TFL) calculated as indicated on figure. Even within error margin (error bars), results do not plot exactly on TFL.

2.2.4.- Discussion – possible origin of melt crust of Veas-01

According to Townley's geological report, a natural terrestrial origin for the Veas-01 Iron Rock is discarded, not consistent with any natural occurring rocks known to Chile as well. This leaves two possibilities, the rock is either man made or it is extraterrestrial. Scientist from Smithsonian Institution, University of Cambridge, JPL at NASA, and others argue (as it will be discussed on the Iron Part study report) for a man made origin, in particular the pure iron nature of the bulk of the rock, and because of the low Ni content of iron. Because all current known siderites have al least 4 or 5% Ni, the low Ni content is by all means the strongest argument against an extraterrestrial origin, as compositional analysis of metal does not fall on any known meteorite classification trend.

If focus is changed to the melt crust, objective of the present report, in particular mineralogy, texture and size of crystals, some similarities may be observed between Veas-01 and known Chrondite mineralogy. Abundant olivine and spinel (Mg-Fe), together with pyroxenes, are common to melt crust on chondrites. Considering that Veas-01 is mostly iron, with only a thin melt crust, yet with a considerable portion of brecciated fragmented rocks in a metal and inddingsite matrix, it bears a distant similarity to H Group Chondrites (High Iron), which may be up to 25 to 31% total iron. Yet, pyroxenes from the Veas-01 are Fe-rich, whereas pyroxenes from H Group Chondrites are Mg-rich (bronzite). Another noticeable characteristic of the Veas-01 melt crust is the presence of a mixed chondrule like matrix with metal blebs, specially marked at surface. Also, presence of calcium-aluminium silicates (Fig. 3) as inclusions among main melt crust minerals, could be compared to calcium-aluminium inclusions (CAIs) typical of chondrites (Scott, 2001; Scott and Krot, 2001).

Despite that some mineralogical characteristics of this melt crust are reported for some industrial steel slag, equigranular millimeter size texture argues against a possible anthropogenic origin. Fayalite and monticellite are known to occur in iron-rich slag, but not with an equigranular faneritic texture. Crystalline texture of both pure iron (hexagonal) and melt crust, melt crust mineralogy and leucite intracrystalline filling, are suggestive of a high temperature (> 1600º C) slow crystallizing process, not expected for industrial steel, much less for slag.

In addition, recent oxygen isotope analysis of melt crust samples indicate values, both for whole rock and mineral, slightly below the terrestrial fractionation line (TFL), even within error margin. Proximity to the TFL has been reported for other known meteorites, such as the Vesta (HED) Meteorites, in which data plot parallel to the TFL at differences below 0.5 for both, $\delta^{17}O$ and $\delta^{18}O$ respect to the TFL (Scott, 2001; Scott and Krot, 2001). High $\delta^{18}O$ may be explained by low temperature water-rich alteration on earth, yet high values like those measured for Veas-01 are also reported for Carbonaceous Chondrites of the CI type (Clayton, 1993). Oxygen isotope results do not out rule an extraterrestrial origin as initially thought, yet more samples of the Veas-01 crust, as well as fragments of the lower breccias should be taken for further analysis, in order to confirm or discard a parallel but different trend from the TFL.

As a final conclusion, the Veas-01 Iron Rock shows many characteristics which are compatible with known meteorites, except for lack of Ni in the iron portion of the rock. Lack of Ni, for some prominent investigators such as Dr. Michael Zolensky or Dr. Bernd Lehmann, is the main argument against an extraterrestrial origin, providing no means of possible known classification for this rock. This said, many other properties of this enigmatic rock do not fit known properties of natural terrestrial rocks, nor do they fit perfectly well, properties of known current artificial materials, such as low carbon steel.

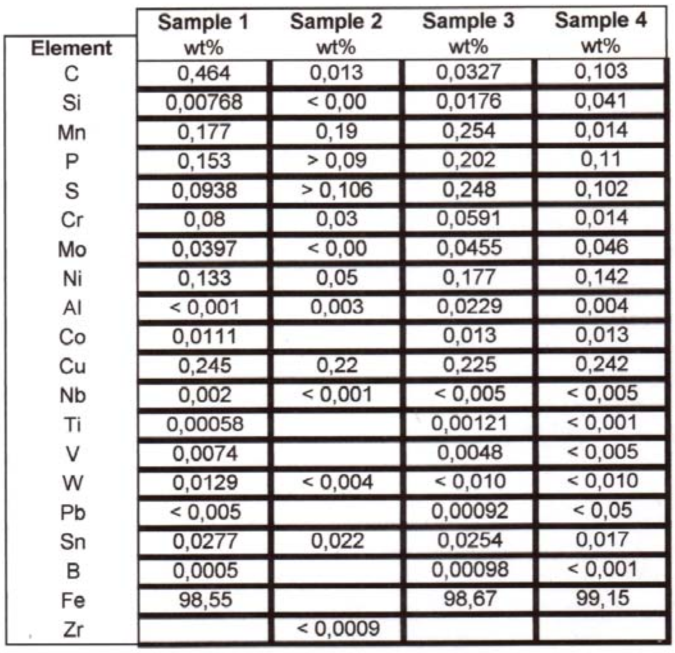
According to geologist Dr. Brian Townley, this rock by all means merits further study. He stated that "Ni could be likely segregated (leached) from surface (all samples are surficial), it could be a one of a kind unclassified iron meteorite (as described in iron meteorite materials by Kotowiecki, 2004) or may be iron steel slag (the least likely, but not impossible).

2.3.- STUDY OF THE INNER SECTION OF VEAS-01

The Veas-01 iron section consists mostly of iron, showing different size bubbles and many inclusions. The rock itself weights approximately 6.2 metric tons and measures some 2.5 by 2.0 by 1.5 meters. It is strongly magnetic. Chemical composition analysis of this rock indicates results (Table 1) which bear no similarity to known steel alloys, so if interpreted as some type of man made steel, compositionally it may not be classified among known types. Samples were sent for analysis by arc fusion and ICP-Optical

Emission Spectrometry (OES) (Samples 1, 3 and 4) and by X-Ray Fluorescence (Sample 2).

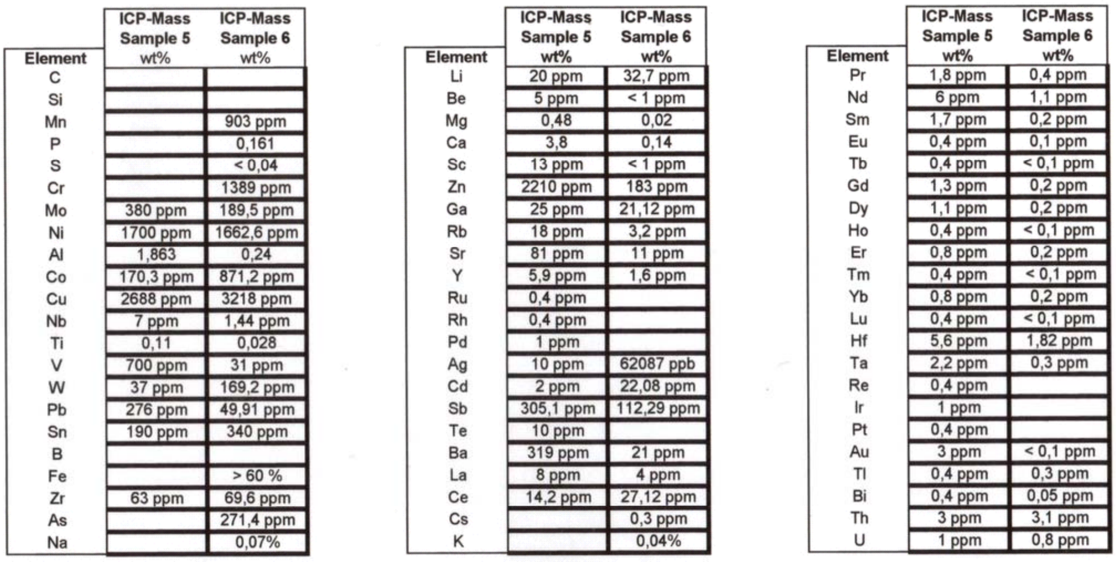
Table 1. Chemical analysis results of 4 samples of the metallic portion of the Veas 01 rock. Samples 1, 3 and 4, arc fusion and ICP-OES. Sample 2, X-Ray fluorescence.



Element	Sample 1 wt%	Sample 2 wt%	Sample 3 wt%	Sample 4 wt%
C	0,464	0,013	0,0327	0,103
Si	0,00768	< 0,00	0,0176	0,041
Mn	0,177	0,19	0,254	0,014
P	0,153	> 0,09	0,202	0,11
S	0,0938	> 0,106	0,248	0,102
Cr	0,08	0,03	0,0591	0,014
Mo	0,0397	< 0,00	0,0455	0,046
Ni	0,133	0,05	0,177	0,142
Al	< 0,001	0,003	0,0229	0,004
Co	0,0111		0,013	0,013
Cu	0,245	0,22	0,225	0,242
Nb	0,002	< 0,001	< 0,005	< 0,005
Ti	0,00058		0,00121	< 0,001
V	0,0074		0,0048	< 0,005
W	0,0129	< 0,004	< 0,010	< 0,010
Pb	< 0,005		0,00092	< 0,05
Sn	0,0277	0,022	0,0254	0,017
B	0,0005		0,00098	< 0,001
Fe	98,55		98,67	99,15
Zr		< 0,0009		

Results indicate low carbon contents for four sub-samples extracted from different surface points of the rock. In addition, samples labeled as five and six were analyzed after total digestion for major, minor and trace elements by HR-ICPMS at Acme Analytical Laboratories Ltd., Vancouver (Table 2).

Table 2. Major, minor and trace element geochemistry by total digestion and HR-ICPMS analysis (ACME Analytical Laboratories Ltd., Vancouver).



Element	ICP-Mass Sample 5 wt%	ICP-Mass Sample 6 wt%
C		
Si		
Mn		903 ppm
P		0,161
S		< 0,04
Cr		1389 ppm
Mo	380 ppm	189,5 ppm
Ni	1700 ppm	1662,6 ppm
Al	1,863	0,24
Co	170,3 ppm	871,2 ppm
Cu	2688 ppm	3218 ppm
Nb	7 ppm	1,44 ppm
Ti	0,11	0,028
V	700 ppm	31 ppm
W	37 ppm	169,2 ppm
Pb	276 ppm	49,91 ppm
Sn	190 ppm	340 ppm
B		
Fe		> 60 %
Zr	63 ppm	69,6 ppm
As		271,4 ppm
Na		0,07%

Element	ICP-Mass Sample 5 wt%	ICP-Mass Sample 6 wt%
Li	20 ppm	32,7 ppm
Be	5 ppm	< 1 ppm
Mg	0,48	0,02
Ca	3,8	0,14
Sc	13 ppm	< 1 ppm
Zn	2210 ppm	183 ppm
Ga	25 ppm	21,12 ppm
Rb	18 ppm	3,2 ppm
Sr	81 ppm	11 ppm
Y	5,9 ppm	1,6 ppm
Ru	0,4 ppm	
Rh	0,4 ppm	
Pd	1 ppm	
Ag	10 ppm	62087 ppb
Cd	2 ppm	22,08 ppm
Sb	305,1 ppm	112,29 ppm
Te	10 ppm	
Ba	319 ppm	21 ppm
La	8 ppm	4 ppm
Ce	14,2 ppm	27,12 ppm
Cs		0,3 ppm
K		0,04%

Element	ICP-Mass Sample 5 wt%	ICP-Mass Sample 6 wt%
Pr	1,8 ppm	0,4 ppm
Nd	6 ppm	1,1 ppm
Sm	1,7 ppm	0,2 ppm
Eu	0,4 ppm	0,1 ppm
Tb	0,4 ppm	< 0,1 ppm
Gd	1,3 ppm	0,2 ppm
Dy	1,1 ppm	0,2 ppm
Ho	0,4 ppm	< 0,1 ppm
Er	0,8 ppm	0,2 ppm
Tm	0,4 ppm	< 0,1 ppm
Yb	0,8 ppm	0,2 ppm
Lu	0,4 ppm	< 0,1 ppm
Hf	5,6 ppm	1,82 ppm
Ta	2,2 ppm	0,3 ppm
Re	0,4 ppm	
Ir	1 ppm	
Pt	0,4 ppm	
Au	3 ppm	< 0,1 ppm
Tl	0,4 ppm	0,3 ppm
Bi	0,4 ppm	0,05 ppm
Th	3 ppm	3,1 ppm
U	1 ppm	0,8 ppm

In addition to the chemical analysis, several metallic polished sections were prepared at sample preparation facilities of IDIEM and the Department of Geology, both from

University of Chile, and afterward studied by Dr. Bernd Lehmann at Clausthal University (Germany) and by Dr. Brian Townley in Chile.

Initial observation of the metallic samples sent to the Technical University of Clausthal, determined an Fe-rich nature and revealed what was thought a well developed Widmanstaetten texture pattern (after etching with concentrated hydrochloric acid; Fig. 5). Nevertheless, microprobe analysis on this same sample indicated low concentrations of Ni, below 0.3% (December 2005). Low Ni was a known fact determined by geochemical analysis and also by our own microprobe analysis, before samples were sent to Germany.

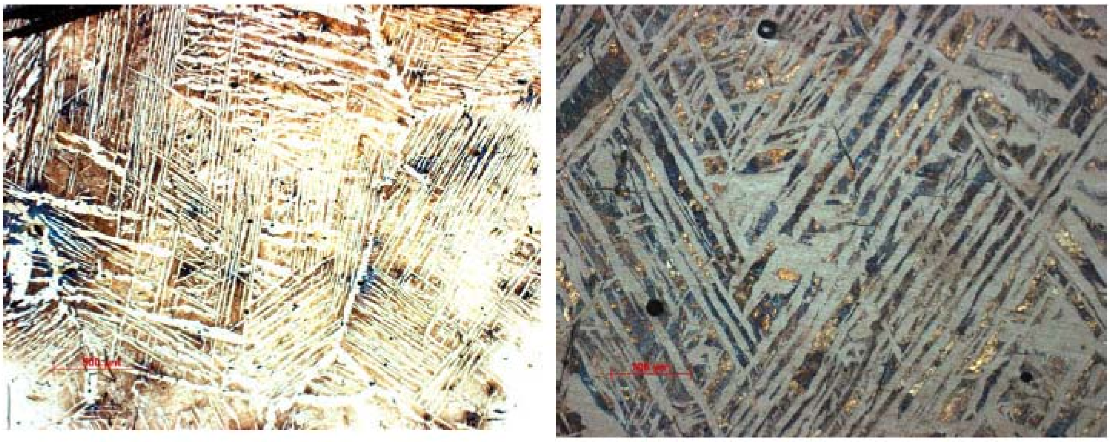


Figure 5. Acid etched metallic sample and Widmannstaetten texture pattern. Width of bands vary from 10 to 50 µm (see scale).

The iron matrix of these samples reveals a metallic body composed mostly of iron. Average weight percent, as determined by SEM/PROBE for some elements are 93.6% Fe, 0.4% S, 0.08% Cr, 0.0025% Mn, 0.054% Ni, 0.2% Cu and 0.053% Zn. Composition taken to 100% is indicative of pure iron (98.8%). These results were confirmed by Dr. Lehmann (Clausthal TU), indicating a practically pure iron composition (100.0 to 102.1% closure), with very low nickel contents, showing two domains, one with 0.0638% and another with 0.1455% Ni.

Many bleb-like mineral inclusions are observed within the pure iron mass, as also observed in the above micro photo (Fig. 5). Analysis of these inclusions indicate various compositions, consisting of FeS Troilite and (Fe,Mn)S phases (Fig. 6). Contents of sulphur, in weight percent, vary between 17.5 and 30.5%; Fe between 31 and 54%, and Mn between 9 and 13%. Other elements present in these inclusions are Cr (1.1 to 3.6%), Ni (0.02 to 0.09%), Cu (0.3 to 0.6%) and Zn (0 to 0.2%). SEM images of some of these inclusions are presented in figure 6.

Results are similar to those indicated by Lehmann (2005) at the Clausthal TU microprobe. Mineral diagnosis for these inclusions indicate Troilite, FeS, and ferroan alabandite or niningerite (Fe,Mn)S (Keil, 1968; Keil and Snetsinger, 1967). Similar results were concluded by the SEM-PROBE analysis at the Department of Geology, University of Chile. Figure 7 shows a chemical map of inclusions showing a Fe-Mn sulphide.

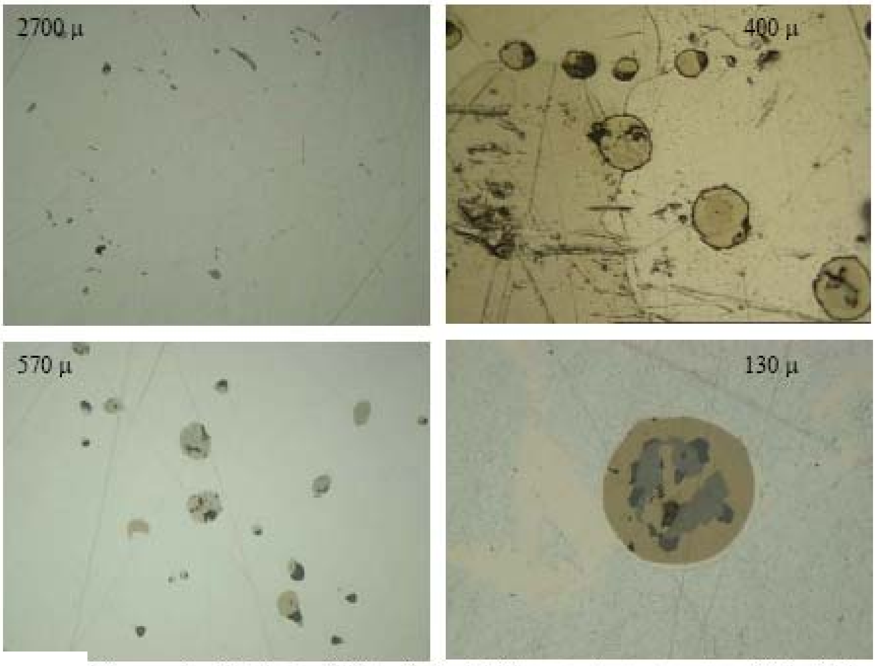


Figure 6. a) iron sample with inclusions (2700 µ side wize), Widmannstaetten texture pattern slightly visible, and hexagonal habit of crystals; b) iron sample with inclusions (400 µ side wize), hexagonal contacts between crystals; c) iron sample with inclusions (570 µ side wize); d) detail of inclusions (130 µ side wize).

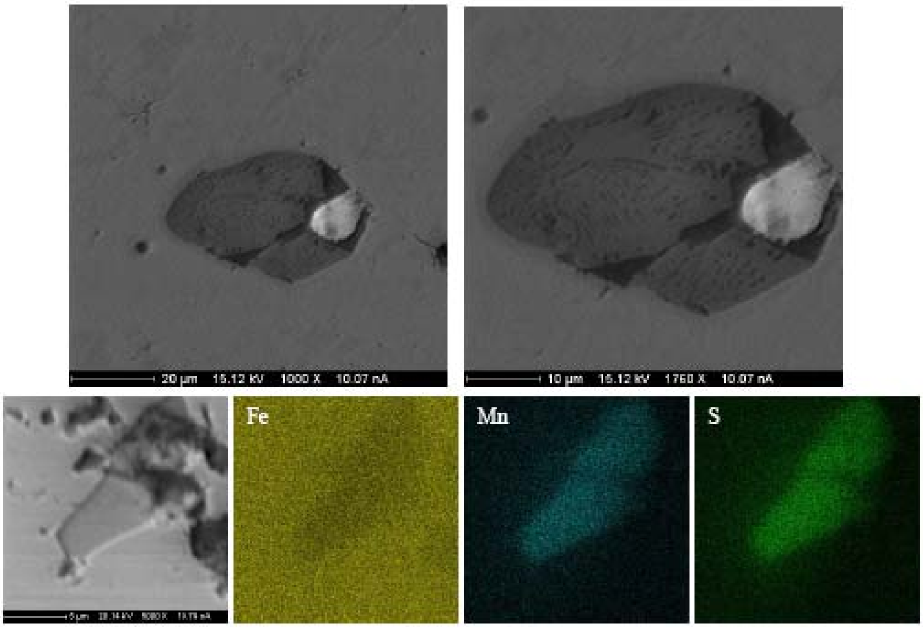


Figure 7. SEM images of bleb – like mineral inclusions (top) and compositional map for Fe, Mn and S (bottom).

Although the study of the melt crust reveals characteristics comparable to the Chondrite families, and therefore, coming from a meteorite made of silicate rocks, there are some institutions around the world that claim the iron forming the interior and core of Veas-01 is man-made in origin, a low C alloy steel. Although many results would contradict a man made origin, such as millimeter grain size crystals of the melt crust (quite different to those found in slag and products of blast furnaces), troilite, (Fe,Mn)S, and preliminary Oxygen Isotope Analysis, prominent researchers around the world have stated that the Veas-01's iron does not fit any known meteorite's metallic composition. Some of their statements are presented below:

Dr. Michael Zolensky, a specialist in meteorites, who works both at NASA Johnson Space Center, Houston, and at University of Arizona, during november, 2003, he wrote: "***After a look in a scanning microprobe, the low Ni content argues for this rock a man-made origin, not a meteorite"***

Dr. Timothy McCoy, American specialist in all types of meteorites and Curator-in-Charge at the Smithsonian Institution, for the National Museum of Natural History (USA), on april 9, 2004, he said in his letter: "***I can say with confidence that this material is not meteoritic and is almost certainly industrial in origin, as you seem to have ascertained from your earlier analyses. Unfortunately, I and my colleagues are not qualified to comment on the specific mechanism by which this material may have been produced"***

Dr. Bernd Lehmann, geologist at the University of Clausthal, Institute of Mineralogy and Mineral Resources, Germany, during april, 2005, stated: ***"We now did electron microprobe analysis on some polished sections. Regretfully, it turned out that the nickel content was in between 560 and 1600 ppm only. This rules out any extraterrestrial origin of this sample, in spite of the Widmanstaetten fabric. I then contacted a metallurgist at our university, and it turned out that micro-Widmanstaetten fabrics are common feature of low-C steel. The meteoritic Widmanstaetten fabric has a bandwidth of more than 0.1 mm, which I was not aware of before. The bandwidth observed in your samples is typical of austenitic steel. I also talked to a specialist in meteorites. There is no hope for your sample being an iron meteorite. The nickel content is just much too low"*** .

Professor Harry Bhadeshia, from the Department of Material Science and Metallurgy, at University of Cambridge, during 2004, he wrote: ***"First thing to emphasise is that your steel has a very low carbon concentration, which means that it will transform rapidly during cooling. Secondly, the austenite grain size is very large, thousands of micrometers in size. This is very important,*** <u>because a large austenite grain size favours the development of Widmanstätten ferrite at the expense of allotriomorphic ferrite</u> ***. The very large austenite grain size means that you must have austenitised the sample at a very high temperature. It is hard to guess the cooling conditions, but the layer of*** <u>allotriomorphic ferrite</u> ***at the austenite grain boundaries is quite thin, which means that the samples will have been cooled relatively rapidly. Notice also that the pearlite between the*** <u>Widmanstätten ferrite</u> ***plates is very fine, and cannot easily be resolved, consistent with a relatively high cooling rate. You also asked about the*** <u>growth rate</u> ***of Widmanstätten ferrite - it is a paraequilibrium displacive transformation so the lengthening rate of the plate in a steel such as yours can be many hundreds of micrometers per second, which means that the microstructure probably developed within a second or so once the transformation began"***.

The arguments of the above mentioned authors against the Veas 01 rock being a meteorite are based on both the current knowledge of low C alloy steels and present knowledge regarding Fe-Ni metal in siderites. To date no single metallic meteorite with

Ni content below 4 or 5wt% has been reported in literature. Provided that chondrules are the oldest formed materials formed in the core of planets of an ancient universe and that these have at least a 4 to 5wt% Ni, there is no possibility an iron meteorite would have only 0.20wt% Ni.

Arguments that iron from the Veas01 rock is of anthropogenic origin, as indicated by the above mentioned authors, are based on the large size hexahedral structure of iron similar to an austenite phase or γ-Fe, which was first studied by Dr. Bernd Lehmann. However, only professor Harry Bhadesia paid attention to this unusual feature for the austenite like structure. Figure 8 shows a millimeter scale microphotograph of common high tech low C steel in which it is possible to observe hundreds of austenite grains. In a same scale microphotograph of the Veas01 iron rock austenite like crystals are so large that the total field of the photo does not reach out of a single crystal. This feature was mentioned by professor Bhadesia whom inquired as to the technology used to fabricate such type of steel.

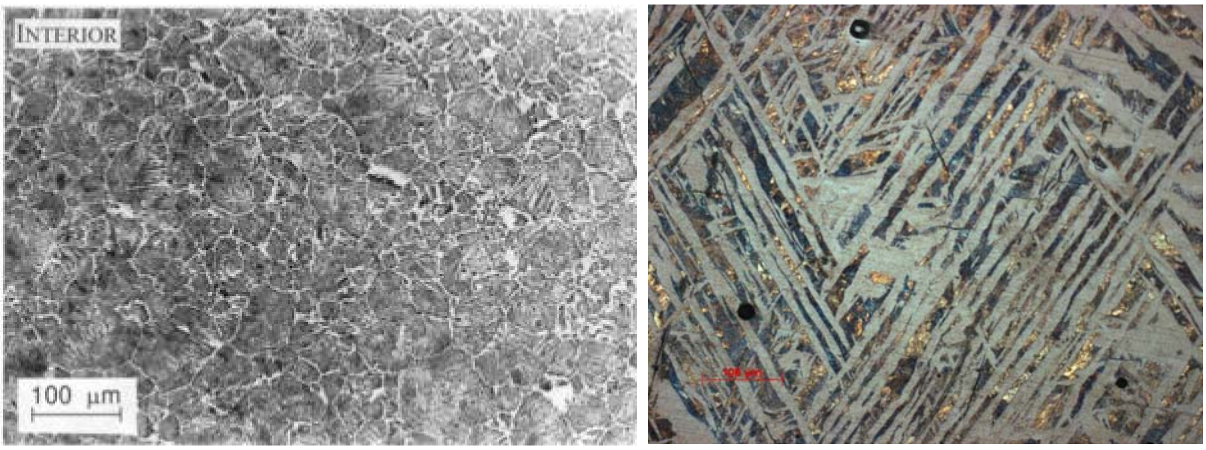


Figure 8. Microphotographs of high tech low C steel in which austenite crystals range in sizes between 10 to maximum 100 um (left) and of the Veas01 rock in which the same optic field falls within a single crystal of an austenite like structure (right). Large band width Wiedmanstaten textures were etched after attack with concentrated hydrochloric acid.

Using the current theory for low alloy steels, including models as the Johnson-Mehl-Avrami equation, Avrami extended space idea for grain boundary nucleated reactions, and quasichemical thermodynamic models as proposed by McLellan and Dunn and by Lacher-Fowler-Guggenheim, at room pressures it is impossible to predict such growth of the grain similar to austenite (that took place in Veas-01) by means of variation of austenitisation temperature, variation of isothermal transformation time or using variation of isothermal transformation temperature. High temperatures with low pressure simply do not fit an iron phase with antiferromagnetic behavior such as that found in Veas-01 steel (Fig. 9).

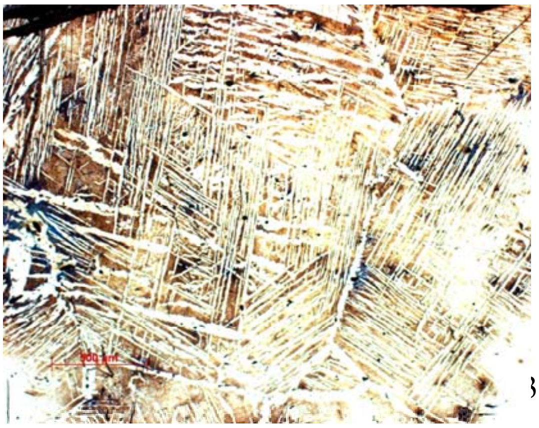


Figure 9. Austenite crystals over 1500 um large (scale in picture). This material observes an antiferromagnetic behavior.

Austenitic iron is a face-centered cubic (fcc) phase which is stable at high temperatures and low pressures and has no ordered magnetic structure. The only stable form of iron at ambient conditions is the body-centered cubic (bcc) phase, which owes its stability entirely to its ferromagnetic nature. By definition, austenite is a metallic, non magnetic solid solution of carbon and iron that exists in steel above the critical temperature of about 723ºC. Its face centered cubic (fcc) structure allows it to hold a high proportion of carbon in solution. Thus, austenite can contain far more carbon than ferrite, between 0.8% C at 723ºC and 2.08% C at 1148ºC. Above the critical temperature, all the carbon contained in ferrite is dissolved (for a steel of 0.8% C) in the austenite. The above mentioned properties of iron do not comply with those of the Veas-01 rock.

High-pressure structures as inclusions and some specific minerals found inside the metal seem to have formed under high-pressure mechanisms, showing phase changes and magnetic transitions. The Veas-01 rock possesses strong surface magnetism, displaying magnetic multi-dominions of both varying intensities and directions (Fig. 10), similar as it occurs for antiferromagnetic materials. Such magnetic properties are only surficial. Measurements three or four centimeters away indicate magnetic field values proper of the earth magnetic field. This property is interpreted as a self cancellation of magnetism associated to magnetic multi-dominion intensities of local scale.

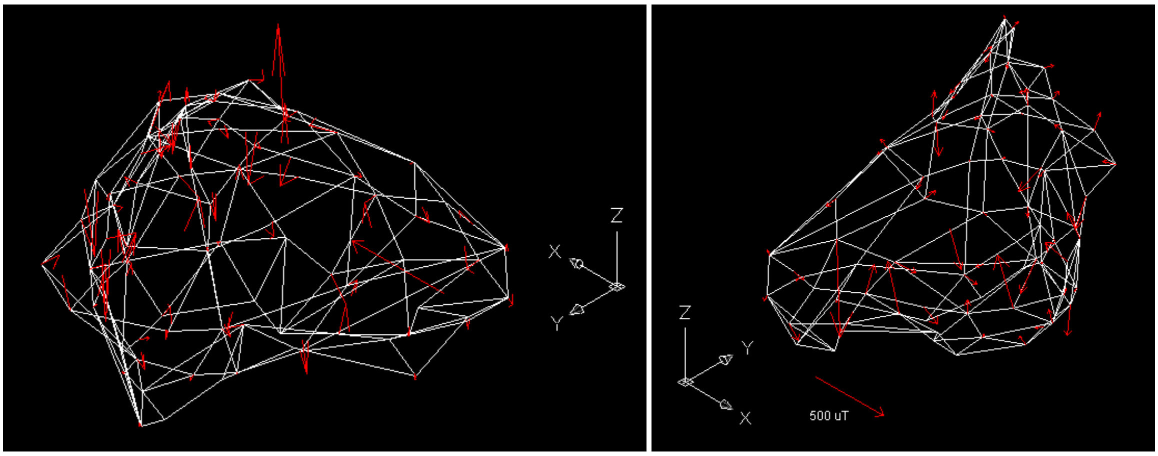


Figure 10. 3D schematic model of measured magnetic vectors, arrows indicating orientation and intensities proportional to length. Measurements were taken millimetrically above surface. Measured magnetic vectors show a multi dominion feature from one point to another and strong surface magnetism. Strong magnetism is not measured at more than 3 cm above surface.

A thermomagnetic study of samples of the Veas-01 rock, carried out by Dr. Pierrick Roperch from the Institut de Recherche pour le Developement (IRD), France, at the Paleomagnetics Laboratory of the University of Rennes, has revealed properties which are not consistent with any known man made types of steel. Figure 11 shows the results of two heating-cooling runs, in which curves show the behavior of samples and display the Magnetic Susceptibility as a function of temperature.

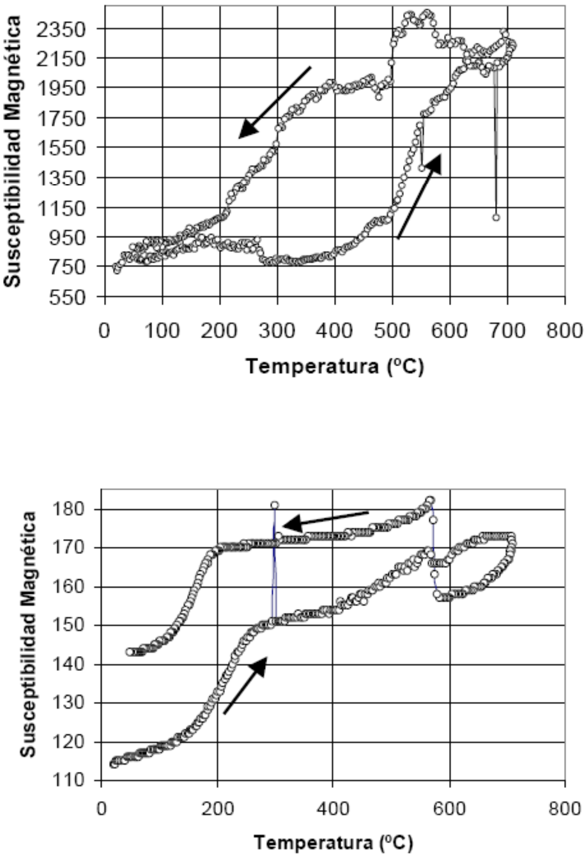


Figure 11. Behavior of two surface samples of the Veas-01 rock. Magnetic susceptibility was not lost even beyond the upper limit of the heating oven at approximately 760ºC. Figure 11a at top, 11b at bottom.

As it can be noted the observed behavior in steel is different from that which may be expected from natural terrestrial samples containing magnetite or wustite. The first curve shows how magnetic susceptibility strongly increases with temperature, going beyond the value of 2350 when reverse cooling process take place in the range between 570ºC to 500ºC.

In addition to the above mentioned studies, three surface samples (ESO-01, 02 and 03) of the Veas-01 rock were subjected to a Prompt Gamma study at the research nuclear reactor of CCHEN, Santiago, Chile. This study was carried in February of 2005 and results were certified by CCHEN and the Ministry of Mining and Energy of Chile, overseers of these research facilities. The objectives of this study were to determine the presence or absence of ^{60}Fe. Unfortunately ^{60}Fe has not been tabulated for this type of analysis, as extraterrestrial standards do not exist. ^{56}Fe, ^{57}Fe and ^{59}Fe were detected for all three samples. A large proportion of the emission spectrums for all samples do not have known interpretation determinations within existing Prompt Gamma data bases, checked with Nist and Budapest. In addition, sample ESO-03 (Fig. 12a) observed intriguing results upon analysis of gamma ray emission spectrums. One very odd result in the lower emission energy spectrum was observed, rechecked for possible errors. Figure 12b shows a detail of the Prompt Gamma emission spectrum in the range 100 to 1000 KeV. Total energy absorption is observed in the range 160 to 720 KeV, at 0 counts, with the exception of two emission windows between 160 and 190 KeV, and a second window between 530 and 550 KeV, both windows at counts exceeding 2500 million, six orders of magnitude higher than the expected spectrum results .

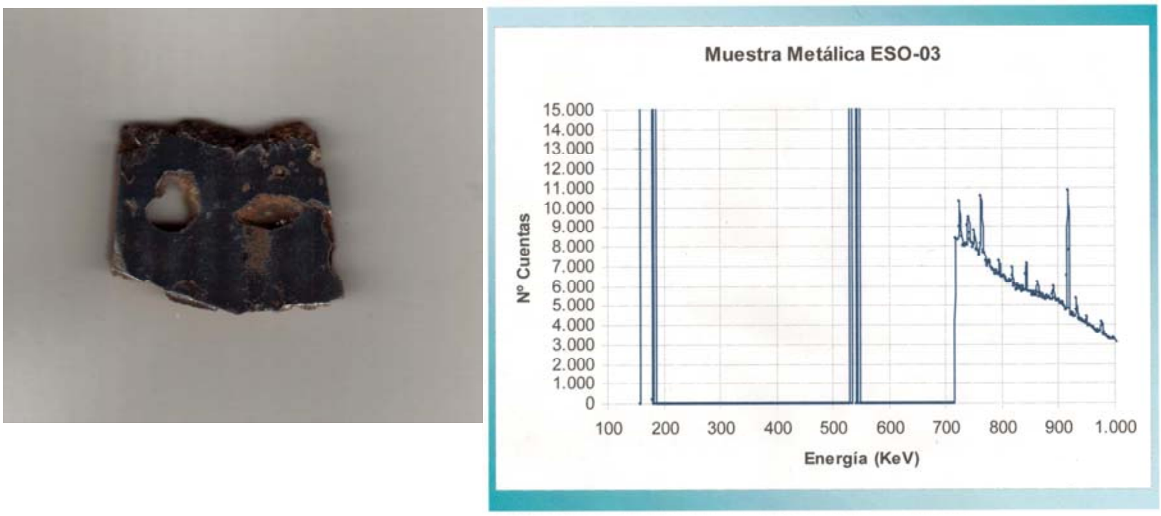


Figure 12. At left, sample ESO-03 submitted for a Prompt Gamma study at CCHEN, Santiago, Chile. At right, detail of lower end spectrum, data rechecked and certified by CCHEN and the Ministry of Mining and Energy of Chile.

We currently do not have an explanation for such behavior, maybe the bubbles or pore boundaries that surround the metallic structure are responsible for such an unexpected result, since the other metallic samples, ESO-1 and ESO-2, with no pores, did not show this anomalous pattern.

A metallurgical micrographic study of metallic samples of the Veas-01 rock revealed some other features which are not consistent with any type of industrial steel or experimental alloys made under controlled laboratory conditions. Figure 13 shows a microphotograph of a polished section amplified 500 times, which shows the well known patterns termed as Neumann Lines and commonly found in many metallic meteorites or siderites. These do not occur in man made materials.

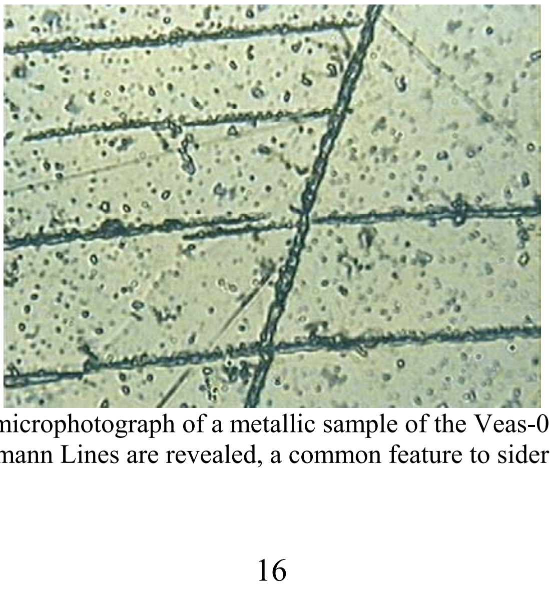


Figure 13. Metallurgical microphotograph of a metallic sample of the Veas-01 rock, at 500x (IDIEM). Neumann Lines are revealed, a common feature to siderites.

Other patterns that reveal both high-pressure mechanism and possible evidence of collisions are commonly observed on hexahedrites (a class of siderite). These are described in literature as “straight lines” perpendicular to each other (Franz Neumann, Beitraege zur Krystallonomie,1823), similar to those observed in the Veas-01 rock. Figure 14 shows a microphotograph and a SEM-PROBE image at even higher detail, in which these features are observed.

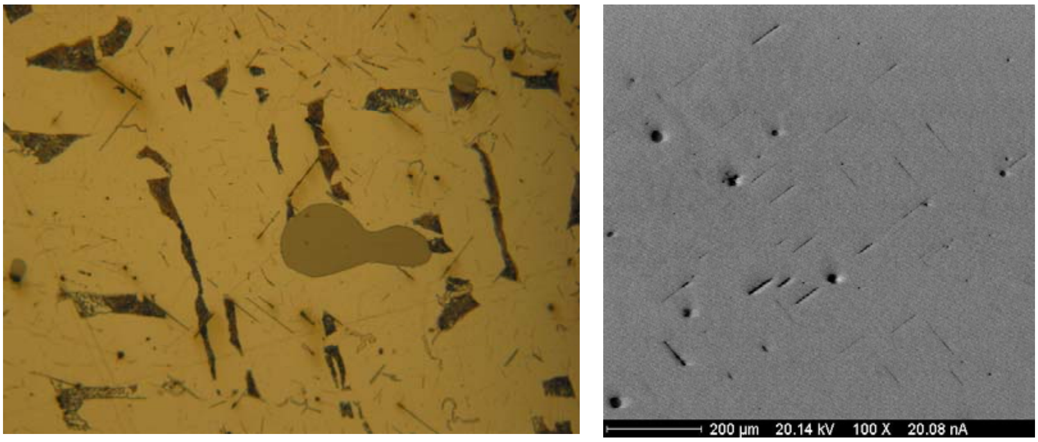


Figure 14. Left, microphotograph of a metallic sample of the Veas-01 rock (at similar scale of SEM image at right), taken at the Department of Metallurgy, Universidad de Santiago. Right, a SEM-PROBE image of a similar sample, taken at facilities of the Department of Geology, University of Chile. Scale bar in photo. Perpendicular lines are a common feature of hexahedrites, interpreted by some authors as evidence of high pressure mechanisms or high pressure collisions.

Additional evidence that could be indicative that Veas-01 iron developed under high-pressure mechanisms is related with the Fe-rich chains found in several subsamples extracted from its iron surface (Fig. 15). Although there are scientists who argued it as belonging to magnetite chains commonly associated to magnetobacteria, our scientific team believes such crystals could be of a non biological origin, as will be mentioned below.

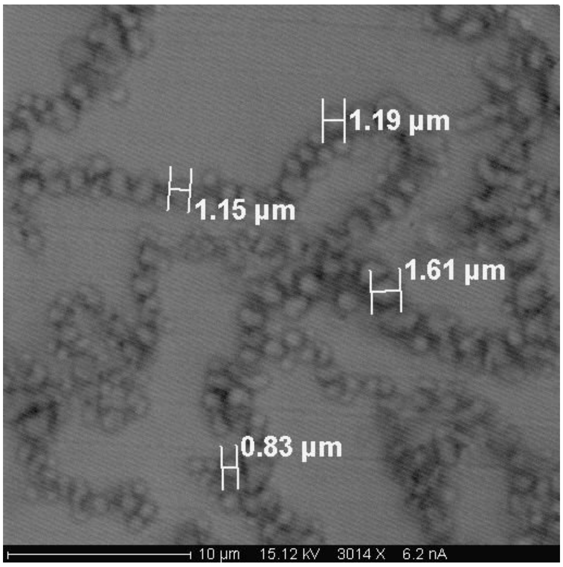


Figure 15. SEM-PROBE image of irregular crystal chains found commonly in samples of the Veas-01 iron rock. Possible evidence of biological origin, crystal sizes much larger than documented magneto bacteria associated crystal chains. Scale bar at bottom of image, size of crystals vary from 0.8 to 1.6 um approximately.

Crystals within metallic chains scattered about the iron matrix of Veas-01 range in size between 830 and 1610 nanometers, much larger than those associated with known cases of magneto tactic bacteria origin in which grain sizes occur within the range 40 to 120 nanometers.

Professor Rodolfo Mannheim, metallurgist of the Universidad de Santiago, in his internal report to Carlos Hidalgo and Asociados, indicated that these wrapped structures have no chemical justification in their formation.

Common steel or iron has not been reported to show these structures, even within current day high-tech procedures.

2.4.- EVIDENCE OF HUMAN MANIPULATION OF THE VEAS-01 IRON ROCK

Two surface rectangular perforations (Fig. 16) occur within the Veas-01 iron rock, of almost identical dimensions (22 cm wide, 5,5 cm tall, and some 17 cm deep). As may be observed in figure 16, the metal surrounding the rectangular orifice shows a melt like texture such as that would be expected from an elevated temperature smelting process. The second orifice on the other side of the rock is more irregular in shape and not only shows melt like textures, but also evidence of a possible explosive reaction as interpreted from a slightly brecciated and rose like structure in a magnetite and wustite matrix. Glassy melt crust from this second orifice was sampled, this crust sample the one that was determined to contain leucite or leucitoid mineral.

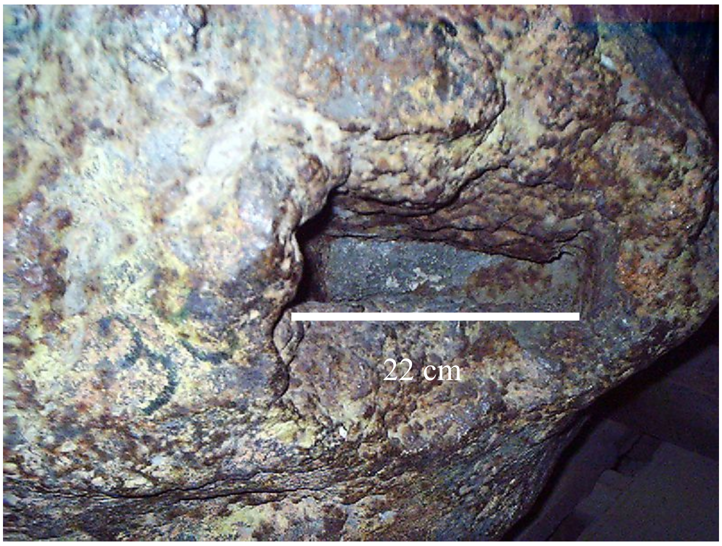


Figure 16. Photograph of man made rectangular orifice within the metallic section of the Veas-01 iron rock. Melt like texture of iron is evident around and within orifice, in particular at end of orifice.

In addition to the two mentioned orifices, two 8 x 8 cms square marks containing perfectly delimited slag or vitreous like minerals were found. These were determined to be a mixture of magnetite and wustite (Dr. Jorge Garín, Universidad de Santiago) easily removable from the rock as a thin melt crust. These are most likely not associated to any extraterrestrial process.

2.5. OTHER INTERESTING TEST RESULTS FOR THE VEAS-01 IRON ROCK

2.5.1.- TEST USING AN INDUCTION-FURNACE

To demonstrate that the “vitreous slag” could be obtained by means of a man-made process, the metallurgist and professor at Universidad de Santiago, Mr. Froilán Barra, used a Power-Trak 35-96 Electric Induction Furnace with a total power of 30 KW and a mean temperature of 2000º C. A 1206 gram sample the Veas-01 iron rock was placed within a crucible and submitted to fusion in the furnace. However, and although common iron melts at 1515º C in less than 8 minutes inside such a furnace, after 1 hour and 30 minutes, and at a temperature around 2000º C, the Veas-01 sample remained unaffected with no visible change of shape. Past this lapse of time the sample emitted explosion sounds and reshaped to the crucible, but never melted. The iron matrix of Veas-01, after 1 hour and 56 minutes, took a “plasticine” texture, but again the structure never melted as normal iron.

2.5.2.- TEST USING A GAS WELDING TORCH

Although common iron “liquefies” in less than 20 seconds under the flame of a 2500º C Gas Welding Torch, a small sample of the Veas-01 iron rock (300 grams) remained unchanged after 10 minutes directly exposed to the flame. After 20 minutes of exposure to the flame at two millimetres, the iron matrix began to melt in very thin layers. After 30 minutes only one centimetre of smelting was achieved. Although chemical analyses of the matrix shows a composition made of almost pure iron, or a class of steel, its behaviour does not fit with any classified high-tech steel or iron. The melted material formed blebs which were later analysed and determined to be a mixture of iron with 6 to 7% nickel (Mannheim, written report, Universidad de Santiago).

2.6.- OTHER INTERESTING FEATURES OF THE VEAS-01 IRON ROCK

2.6.1.- WEIRD GROOVES

Common features observed in most polished samples during the metallographic studies of the metal matrix of the Veas-01 iron rock are regular shaped grooves. These grooves have a regularly spaced zipper like structure, approximately 82 um in length (Fig. 17).

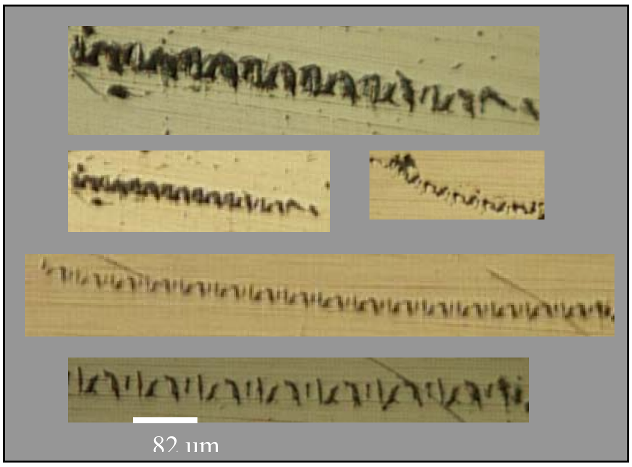


Figure 17. Examples of regular zipper like structures observed in the metal matrix of polished samples of the Veas/01 iron rock. Patterns have a periodic spacing of approximately 82 um.

2.6.2.- LEUCITE IN SOME AREAS AT THE MELT CRUST

Although a leucitoid composition mineral ($KAlSi_3O_8$) was determined by SEM-PROBE analysis, interpreted as leucite, maskelynite ($NaAlSi_3O_8$) and leucite are both members of the same chemical family. Leucite ($KAlSi_2O_6$) is a high temperature form of K-feldspar formed at maximum pressures up to 2 GPa. In contrast, maskelynite forms at higher pressures, up to 18 GPa. Given this information, leucite would be an unlikely mineral in meteorites, as pressures associated with meteorite impacts usually exceed 20 to 25 GPa.

Dr. Xi Liu (Louie) of the Department of Earth Sciences, University of Western Ontario, Canada, indicated that leucite or leucitoid minerals may be present in meteorites as a result of crystallizing processes after a high pressure impact (written comm.).

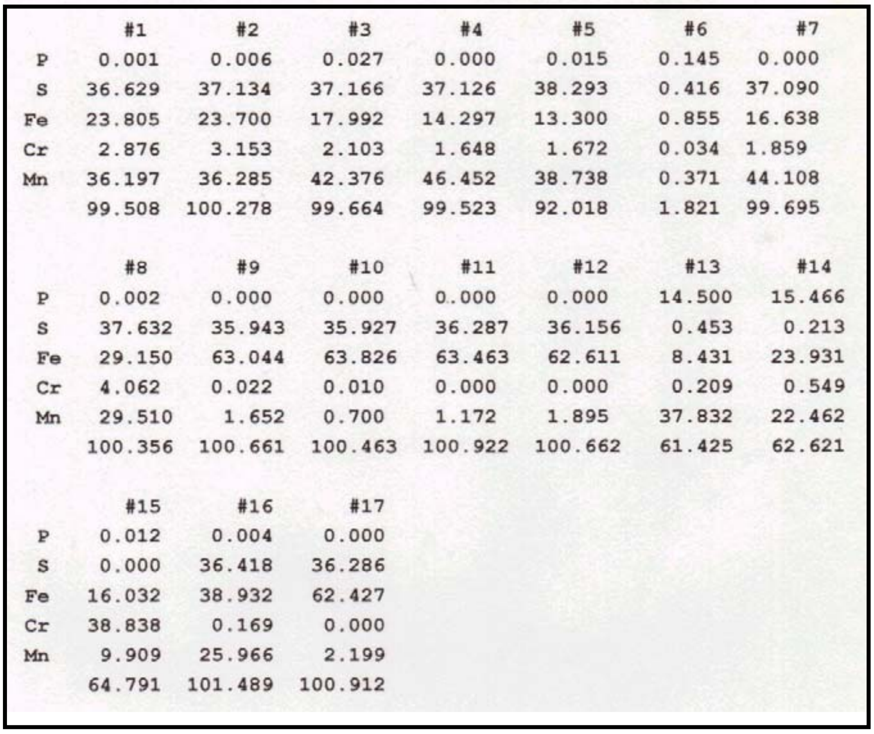
In fact, Louie stated via e-mail message, on july 31, 2007, the following: “Leucite is a high temperature form of K-feldspar, formed at pressures up to ~ 2GPa. Since the peak P-T condition during the shock event was much higher, it should not be possible to find leucite (in meteorites) formed under that condition. But leucite might occur (in meteorites) crystallizing from the maskelynite after the shock. I hope my words are helpful to you”.

2.6.3.- IRON-MANGANESE SULPHUR

Dr. Jorge Garin (metallurgist at Universidad de Santiago) and Dr. Bernd Lehmann (geologist at TU Clausthal, Germany), separately found an odd sulphur inclusion formed exclusively by Fe and Mn. According to Dr. Garin, who searched existing databases for such a composition, as well as participated in a Metallurgy Congress in Arizona at which he consulted every expert in this matter, has stated that this could be the first time such a mineral inclusion is described. Indeed, Fe and Mn do not form a single Fe-Mn sulphide during smelting processes. MnS is a common inclusion found as a product of blast furnace steel, but has never been reported with Troilite, FeS, and much less as an (Fe,Mn)S.

In Enstatite Chondrites meteorites such as Kota-Kota and Qingzhen, magnesium-manganese-iron sulphides (Mg, Fe, Mn)S have been reported, known as Niningerite. Troilite, FeS, which was described for the first time by the Jesuit priest Dominic Troili in 1766 when he studied the Albareto meteorite fall in Modena (Italy), was determined present in the Veas-01 iron rock (Dr. Bernd Lehmann, TU Clausthal, 2005; internal report). Composition determined in this Microprobe analysis is 36.29 wt% S and 63.46 wt% Fe. Dr. Lehmann also determined the presence of the Iron-Manganese Sulphides (Fe,Mn)S, which in some cases are also chromium bearing. Results are presented in Table 3.

Table 3. Microprobe analytical results for samples of the iron matrix of the Veas-01 iron rock, as determined by Dr. Lehmann, TU Clausthal, Germany. CAMECA SX100. Analytical points 1 to 5, 7, 8 and 16 represent an (Fe,Mn)S. Analytical points 9 to 12 and 17 represent Troilite (FeS). Analytical points 6, 13 and 15 did not close to 100%.



	#1	#2	#3	#4	#5	#6	#7
P	0.001	0.006	0.027	0.000	0.015	0.145	0.000
S	36.629	37.134	37.166	37.126	38.293	0.416	37.090
Fe	23.805	23.700	17.992	14.297	13.300	0.855	16.638
Cr	2.876	3.153	2.103	1.648	1.672	0.034	1.859
Mn	36.197	36.285	42.376	46.452	38.738	0.371	44.108
	99.508	100.278	99.664	99.523	92.018	1.821	99.695

	#8	#9	#10	#11	#12	#13	#14
P	0.002	0.000	0.000	0.000	0.000	14.500	15.466
S	37.632	35.943	35.927	36.287	36.156	0.453	0.213
Fe	29.150	63.044	63.826	63.463	62.611	8.431	23.931
Cr	4.062	0.022	0.010	0.000	0.000	0.209	0.549
Mn	29.510	1.652	0.700	1.172	1.895	37.832	22.462
	100.356	100.661	100.463	100.922	100.662	61.425	62.621

	#15	#16	#17
P	0.012	0.004	0.000
S	0.000	36.418	36.286
Fe	16.032	38.932	62.427
Cr	38.838	0.169	0.000
Mn	9.909	25.966	2.199
	64.791	101.489	100.912

3.- DISCUSSION AND CONCLUSIONS

All currently available data for the Veas-01 iron rock definitely out rules a terrestrial natural origin and only allows two other possible sources, one extraterrestrial, the second, man made. An extraterrestrial origin is complicated by the facts that properties of this rock do not fit any known classification of meteorites, yet this would also be true for a large number of unclassified meteorites existing in literature. As a man made origin can not as yet be totally discarded, despite the fact that many of the above documented properties of Veas-01 do not fit any known steel types or steel making technology, additional studies are warranted for this rock. At our current knowledge the strongest argument for Veas-01 being a meteorite relies on properties which are not explained by any man made materials, which may be present in extraterrestrial materials of unclassified origin. Some of these properties are discussed below.

1) Austenite steel has no magnetic properties, because of it face-centered cubic (fcc) structure, and Widmanstaetten ferrite growing from grain boundaries are detrimental for such type of steel because of the cracks forming during cleavage failure, which propagate virtually undeviated across individual sheaves of bainite in low carbon alloy steels. In contrast, Veas-01 iron possesses a millimeter size grain austenite “like” structure forming inner phase “like” Widmanstaetten ferrite. If the steel of Veas-01 is in fact of the austenite type, it would not have antiferromagnetic properties or multi-

dominion distribution, and second, if Widmanstaetten ferrite should occur within the supposed “austenite”, then the Rock as a whole should show deep weathering of crust and low hardness. Weathering of iron of this rock is only few millimeters thick and hardness is comparable to that of steel. This rock has been documented on site in Santiago for over 100 years, exposed to current weathering effects.

2) Magnetic and antiferromagnetic (afm) behavior on the supposed “austenite”, low Ni contents, large “austenite” crystals unknown to current steel making technologies, odd and strongly magnetic susceptibility values shown in thermomagnetic studies, hardness to weathering, inclusions and blebs showing high-pressure structures, all argue against an “man-made” unknown technology and much less an ancient anthropogenic origin.

In addition, twin plane structures, Neumann lines and Fe-rich crystal chains are indicative of high pressure – temperature conditions during formation, possibly at pressures up to 15 or 20 Gpa. Leucitoid minerals found within the melt crust of Veas-01 may have formed by secondary crystallizing processes from maskelynite after a shock impact. Maskelynite is a well studied mineral which occurs in litites (stone meteorites), and may be found in other unchanged areas of the stony crust or breccia of the Veas-01 iron rock.

Another conclusion that argues against a man made origin is the presence of Troilite and Iron-Manganese Sulphides in the Veas-01 iron rock matrix. Such minerals have not been reported as existing in steel or pure iron produced by blast furnace technology, much less in slag. The extremely high melting temperature (up to 2500º C) of samples of this rock, mostly pure iron, does not fit any known steel product. The above mentioned arguments lead to one plausible conclusion, that the Veas-01 iron rock is a very unusual type of Siderite, never described in literature and so far impossible to classify. Veas-01 is for now considered an unclassified Iron Meteorite.

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Appendix I: SOME INTERESTING HISTORIC FACTS REGARDING THE JESUIT ORDER AND IRON METEORITES

The Jesuit missionaries have been documented as the first religious Order in paying attention to meteorites. Around the year 1570, a Jesuit group imbedded with spanish soldier patrols found that some natives of "El Chaco" (today a Province of Argentina) used bolas made of pure iron inside. After searching and questioning the natives, they were led to a large field today known as "Campo del Cielo" with a big table-like stone from which natives extracted iron. This 22 ton iron rock from which metals were extracted was table shaped, from which the name "El Meson de Fierro" was derived. This siderite was taken from its original site sometime in 1790, with no further registered appearance there after.

During 1580, a Jesuit priest named Manuel de Nobrega and after that, in 1650, the Jesuit Simon de Vasconcellos, both in Brasil, discovered some weird rocks at different locations. In addition, two meteorites currently held by the Smithsonian Institution, and known with the name of the Tucscon Meteorites, were discovered by Jesuit missionaries in sometime in the year 1730.

In 1766, near to the town of Modena, in Italy, a meteorite fall in Albareto was studied by the Jesuit priest Dominic Troili, who discovered a very interesting inclusion of sulphur and iron. This mineral inclusion is known today as Troilite.

In fact, some people believe the heavy chalice recovered in silver which was stolen from the "Mueseo de la Catedral de Santiago" had a unique value not only for its design and details but for its metal matrix. Since it took jesuits from "Calera de Tango" 19 yeras to forge such a reliquary, the iron matrix chalice has been thought made of an iron meteorite (verbal comm., researchers of the Cathedral Museum). By the mid 18th century, German priests from the Jesuit farm in Chile had the same metal working knowledge as their brothers in Poland. In Poland some reliquaries have been demonstrated to be made of meteorite iron (Kotowiecki, 2003). Recently, in 2002, Dr. Andrzej Kotowiecki discovered a black stone in the shape of a chopper in Poland with the characteristic regmaglypts (an element of the appearance of a meteorite). The chopper's dimensions are: 15 x 8 x 8 cms, and this object is used every Good Friday during a ceremony in which members of the Archifraternity (12 members and a leader) are wearing habits made of sackcloth and hoods with holes for the eyes.

Farms acquired by the Jesuit order in Santiago until their expulsion from Spain and its empire, each had its own metal working factory, and the "La Olleria" farm (where Veas-01 was discovered) was no exception. This farm was over 200 hectares. The large quantity of steel and iron confiscated in August, 1767, mostly from Jesuit farmlands, suggests that the Jesuits were the only people with the knowledge to reuse meteorite iron. Before and after them nobody had technology or knowledge for working any sort of iron or steel. Low alloy steel techniques were developed in 1855 in England by Henry Bessemer, when he invented the Bessemer Furnace to produce low carbon steel. Until this year, in Chile, is was not possible to forge a Veas-01 steel type, because its "austenite" like crystals are too large and antiferromagnetic compared to current steel. Common steel has an austenite crystal size no larger than 150 microns and provided an fcc structure it is not magnetic. It is difficult to understand why "austenite" like steel in Veas-01 is magnetic and why crystal size can reach up to 2000 microns.

Although it is clear that the whole object named Veas-01 and its iron matrix were not made by the jesuit priests or missionaries, some rectangular holes of 22 x 5.5 cms and other square marks seem to demonstrate a man-made intervention. In Chile, the purest metal forged was cooper, and the furnace from which this cooper was made was used until 1470 by natives and its name remains to the present day: Viña del Cerro; located 87 kilometres to the east of Copiapó city. Next to the Viña del Cerro copper-furnace, from 1470 to 1730, there are no reports to confirm the use of iron before the arrival of jesuits. After Carlos III expelled the Jesuit Order from America in 1767, their farms remained abandoned for 10 year, and were auctioned in 1776 to people who had no idea how to best use such farms. In 1830 only two farms were settled. Between 1830 and 1881 the farm "La Ollería", where Veas-01 was found, was subdivided into lots. In 1881 the testate succession of Honoria Gandarillas Valdes sold the current terrain, which today is used by the Pontificate Catholic University of Chile. The terrain located two kilometres west of the university campus (where Veas-01 was reported the first time) remained very poor and undeveloped until 1960, approximately.