

Frontier Analysis, Ltd

TECHNICAL SERVICE RESPONSE NO.: UT071

Subject: Addendum to UT069: Identification of a White Powder Found in a Crop Formation (Hoeven, Holland, October 5, 2009)

Date: June 22, 2010

Requested By: Nancy Talbott
BLT Research

Reported By: P. A. Budinger
Analytical Scientist

Background/Objective:

A white powder found in a crop formation in Holland (October 5, 2009) was identified by this laboratory as a hydrated form of magnesium carbonate, specifically with formula $(\text{MgCO}_3)_4 \bullet \text{Mg}(\text{OH})_2 \bullet 5\text{H}_2\text{O}$. In the analytical report (Technical Service Report: UT069) a recommendation was made to do additional ICP-MS analysis to determine both the magnesium isotopic ratios¹ and purity. More of the sample was submitted on February 24, 2010 from this event to do the recommended analysis.

Conclusions:

- The white powder is confirmed by FT-IR² to be the same hydrated form of magnesium carbonate (approximate formula of $(\text{MgCO}_3)_4 \bullet \text{Mg}(\text{OH})_2 \bullet 5\text{H}_2\text{O}$) as the previous sample received October 5, 2009.

¹ Isotopic (measurements) ratios of the elements can be taken by ICP/MS (Inductively Coupled Plasma/Mass Spectrometry) to see if they differ from terrestrial values. An element is defined by the number of protons in its nucleus. Most elements have two or more isotopic forms. That is, the element may have more or less neutrons. Each neutron has a weight of one. So an isotope with more neutrons weighs more than an isotope with less. The ratios of isotopes for any given element on earth will always be the same, i.e. it's a constant. The theory is that these isotopic ratios might be a result of the elements formation in the earliest phase of our solar system, i.e. they are unique to this system. It is thought that these ratios might vary in other solar systems because the elemental formations may have been different. So, if we find the ratios are not normal as compared to terrestrial elements, then the sample may have an extraterrestrial origin.

² **FT-IR (Fourier Transform Infrared Spectroscopy):** Infrared spectroscopy is used for the molecular structure identification and quantification of solids, liquids, and gases. An infrared spectrum is the result of light (in the 2 to 25 micron wavelength range) interacting with the vibrations of molecules. The particular set of vibrations of a molecule gives rise to specific spectral absorption bands, often referred to as the "fingerprint" spectrum.

- ICP/MS shows the isotopic ratios of magnesium are normal for terrestrial magnesium.
- The ICP elemental results show the magnesium carbonate is 99.99% pure. The surprising results would suggest that the material is chemically made and/or refined from a natural source. Clearly, at this purity it is beyond agricultural use which appears to be about 85% purity (<http://www.sangamproducts.com/Magnesium.html>). Magnesium carbonate at this 99.99% purity could be found in a laboratory storeroom. Alfa Aesar sells 99.996% pure magnesium carbonate at \$717.00 per 100 grams (<http://www.alfa.com/en/GP100w.pgm?DSSTK=010796>). This is rather expensive, but copious amounts of this material have been recovered from various formations and other bizarre events.³
- What is puzzling is that material recovered from an open field should have evidence of contamination with airborne dust particles. Of course, one could argue that the dust would only be on the surface, so if the sample were taken from the center of the pile, one might avoid contamination. But if one just shoveled the material into a bucket, one would expect mixing.

Procedure:

More white powder from the October 5, 2009 crop formation in Holland was submitted on February 24, 2010. An infrared spectrum was obtained of the new sampling to confirm it was the same material as submitted on October 5, 2009. The spectrum was obtained of the sample on the Thermo Electron Avatar 360 spectrometer using the Smart Herrick diamond sampling accessory.

The sample was then sent for ICP-MS analysis to "ICP and ICP/MS Services". Magnesium isotopic analysis and a survey elemental analysis for purity were requested.

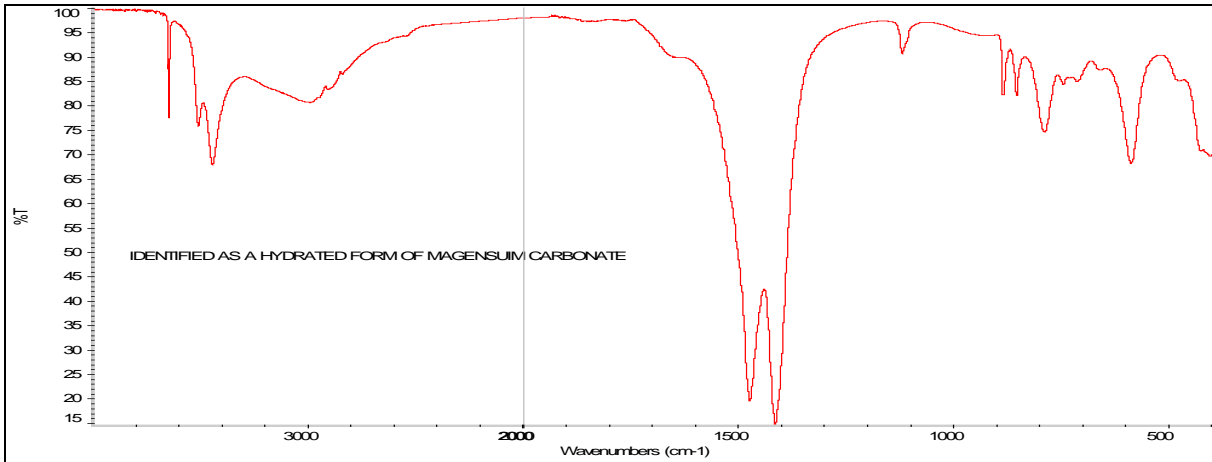
Results:

Infrared Analysis

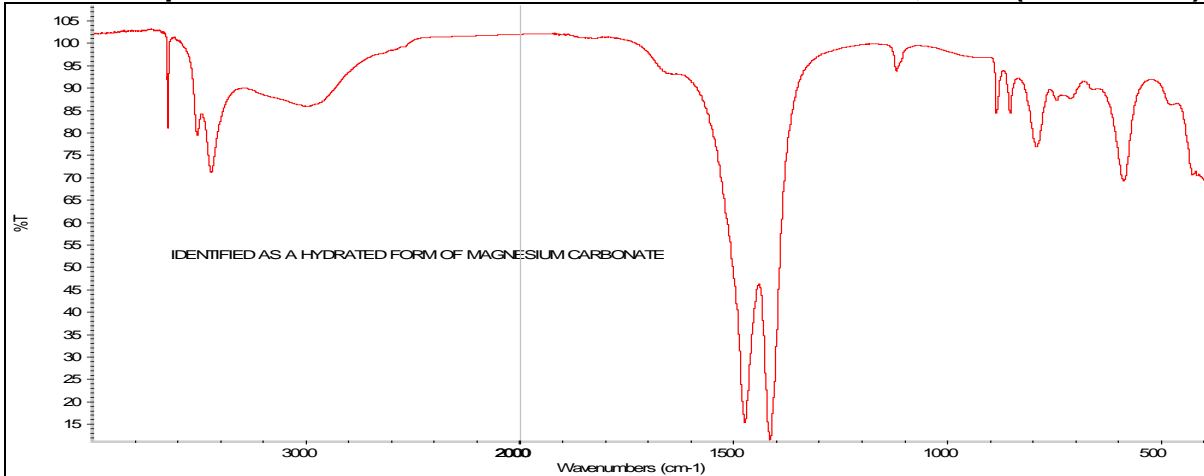
Infrared analysis shows the new sample is magnesium carbonate, and it appears to be in the basic form, i.e. the chemical structure is $(\text{MgCO}_3)_4 \bullet \text{Mg}(\text{OH})_2 \bullet 5\text{H}_2\text{O}$ (a close approximate). The spectrum matches that of the sampling received October 5, 2009. Following are spectra of the new sample, along with those of the older sample and a reference of the (basic) form of magnesium carbonate for comparison.

³ <http://www.blresearch.com/>

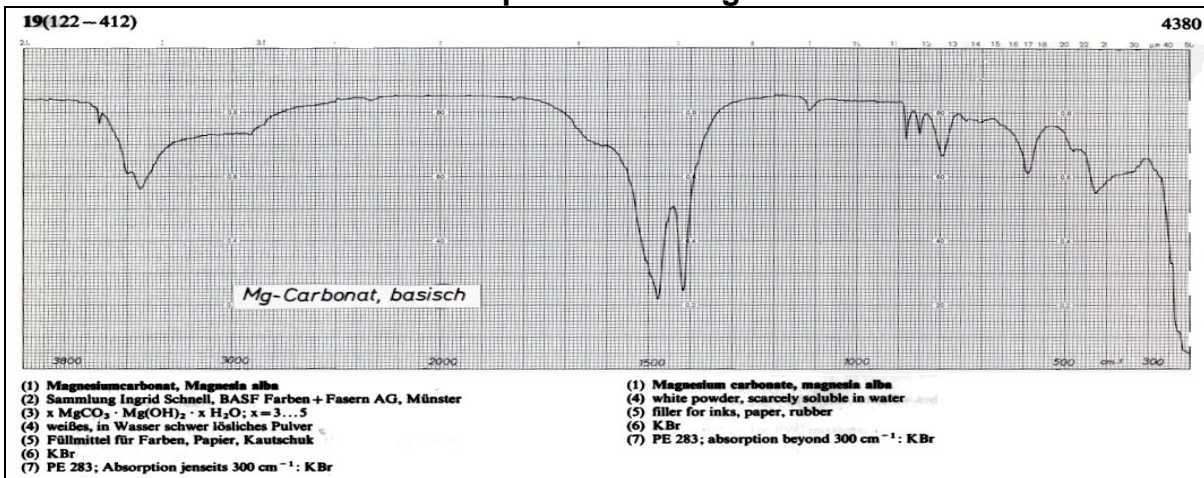
Infrared Spectrum of the New White Powder Sampling Received February 24, 2010



Infrared Spectrum of the White Powder Received October 5, 2009 (TSR UT069)



Infrared Reference Spectrum of Magnesium Carbonate.



Reference from: Prof. Dr. Dieter O. Hummel, Atlas of Polymer and Plastics Analysis, "Inorganics Section", Verlag Chemie GmbH, Df-6940 Weinheim, 1984, Part a/II, Ref. 4380.

ICP-MS Analysis from ICP and ICP-MS Services

The isotopic ratios for magnesium are compatible with terrestrial values. Two runs of two aliquots of the sample were done. These values compare to those of two runs of a terrestrial magnesium standard. Note, the three isotopes of magnesium Mg-24, Mg-25 and Mg-26 were measured. The following table shows the results.

ISOTOPE RATIOS

All results reported in percent abundance

Sample ID	Mg-24	Mg-25	Mg-26
Aliquot 1 – Run 1	78.60	10.11	11.29
Aliquot 1 – Run 2	78.56	10.14	11.30
Aliquot 2 – Run 1	78.64	10.09	11.27
Aliquot 2 – Run 2	78.56	10.11	11.32
Mg Standard – Run 1	78.61	10.10	11.29
Mg Standard – Run 2	78.59	10.12	11.29

The elemental analysis shows the sample is at least 99.99% pure. The only other element detected by ICP is calcium at 10-100ppm. The surprising results would suggest that the material is chemically made and/or refined from a natural source. Clearly, at this purity it is beyond agricultural use which is about 85% purity.⁴ Magnesium carbonate at this purity could be found in a laboratory storeroom. Alfa Aesar sells 99.996% pure magnesium carbonate at \$717.00 per 100 grams.⁵ Following is a table showing the results.

SEMI-QUANTITATIVE ANALYSIS

Concentration	Elements
Major (>10%)	Mg
10-100 ppm	Ca
Not Detected <10 ppm)	B, Al, Si, P, S, K, Fe
Not Detected (< 1 ppm)	Li, Be, Na, Sc, Ti, V, Cr, Mn, Ni, Co, Cu, Zn, Ga, Ge, As, Se, Rb, Sr, Y, Zr, Nb, Mo, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, Cs, Ba, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb, Bi, Th, U

⁴ <http://www.sangamproducts.com/Magnesium.html>

⁵ <http://www.alfa.com/en/GP100w.pgm?DSSTK=010796>

File: UT071

Phyllis A. Budinger

ACKNOWLEDGEMENT: This laboratory appreciates and thanks Nick Reiter for his input on this analysis.