Frontier Analysis, Ltd

TECHNICAL SERVICE RESPONSE NO.: UT075

Subject: Analysis of Vegetation and Soil after Contact with a Glowing Metallic Object (Miami, Florida, January 2, 2011)

Date: March 16, 2011

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Background/Objective:

On January 2, 2011, 6:30 p.m. a glowing metallic sphere was observed to shoot up to the sky from the witnesses back yard. On the ground two circular marks approximately 9 inches in diameter and side by side were noted on the grass where the object had apparently been in contact. The eastern spot (Site A) appeared to suffer a bleaching effect, i.e. was an off-white color. The western spot (Site B) appeared to be burned from top down.

Conclusions:

- No unusual anomalies were detected in the vegetation and soil samples from contact site A. They are similar to the control vegetation and soil samples, and no differences were noted.

- Some vegetation from the contact site B was found to be burned. However, the soil was normal, showing no heat effects. So, the heat was localized and not hot enough to cause any changes to the soil. The source of the heat is indicated to originate from the sphere. It is speculated that either the sphere was hot, or that there was an energy field around it that induced the vegetation to burn. There was more inorganic nitrate in this soil sample, but this may be from uneven fertilizer application. Another possibility is that if the sphere had an ionizing energy field around it, then interaction with the air may have produced nitrates.

- The so-called ‘ash’ is actually plant/grass fines. No unusual anomalies are detected.

- No radiation above background was detected for any of the samples. Additionally, no material was observed to fluoresce under UV light.

Procedure:

Samples: The following samples were received on January 7, 2010. They were sampled from the sites A and B on 1-6-2011 at 5:50 p.m., and placed in Ziploc bags. They are:

- #1 – Trace Evidence A - Vegetation
- #2 – Trace Evidence A - Soil, Organic Layer
- #3 – Trace Evidence B - Vegetation
- #4 – Trace Evidence B - Soil, Organic Layer
- #5 – Control Location - Vegetation
- #6 – Control Location - Soil, Organic Layer
- #8 – Trace Evidence A - Composite Sample
- #10 – Trace Evidence B - Composite Sample

The next sample was taken on 1-3-2011 at 6:40 p.m., and received January 13, 2011. It was submitted in a plastic vial.

- #11 – Ash (Identified as "powdery ash from the ground.")

FT-IR (Fourier Transform – Infrared) spectra[1] were obtained from all the samples 'as received'. Additionally, water extracts were done on all samples. Spectra were acquired from the water soluble residues. These spectra were obtained on Thermo Electron's 360 Avatar FT-IR spectrometer using the Smart Herrick diamond sampling accessory. The samples were also examined with a radiation meter and a UV light.

Results:

The results of the individual tests done on the samples follow. These results are summarized in the conclusions section on page 1 of this report. It should be noted at this point that no radiation above background was detected for any of the samples. Additionally, no material was observed to fluoresce under UV light.

The compositions of the control samples are discussed first. The analysis is necessary for comparison to those in contact with the sphere. It is important to note any differences. Multiple infrared spectra were obtained from all samples.

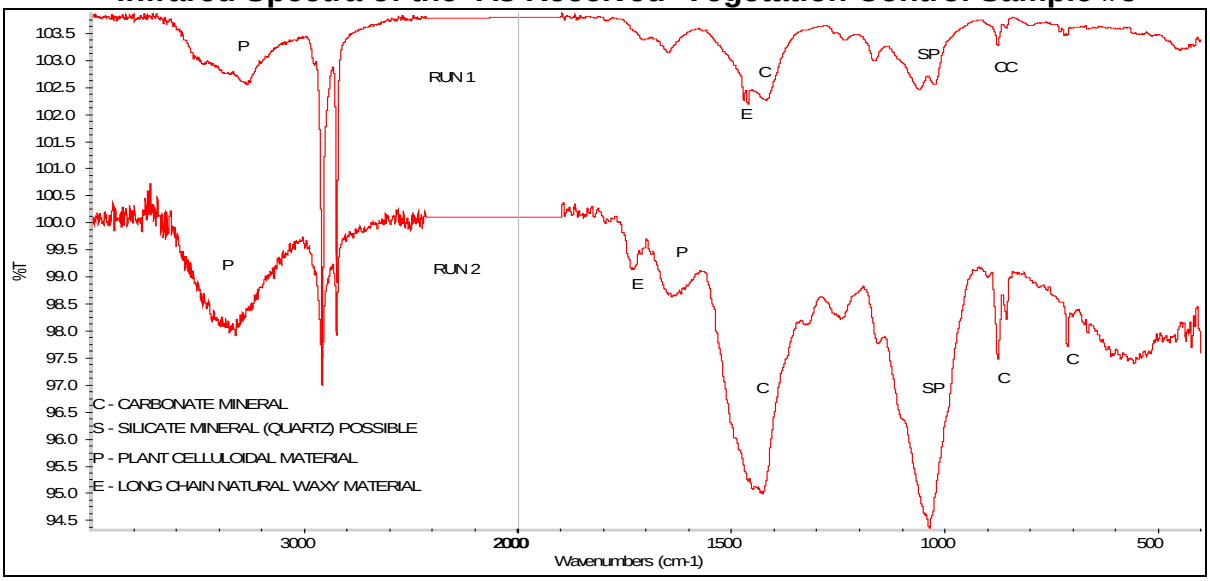
[1] **FT-IR (Fourier Transform Infrared Spectroscopy):** Infrared spectroscopy is used for the molecular structure identification and quantification of solids, liquids, and gases. An infrared spectrum is the result of light (in the 2 to 25 micron wavelength range) interacting with the vibrations of molecules.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

Control Samples

Control Vegetation Sample #5

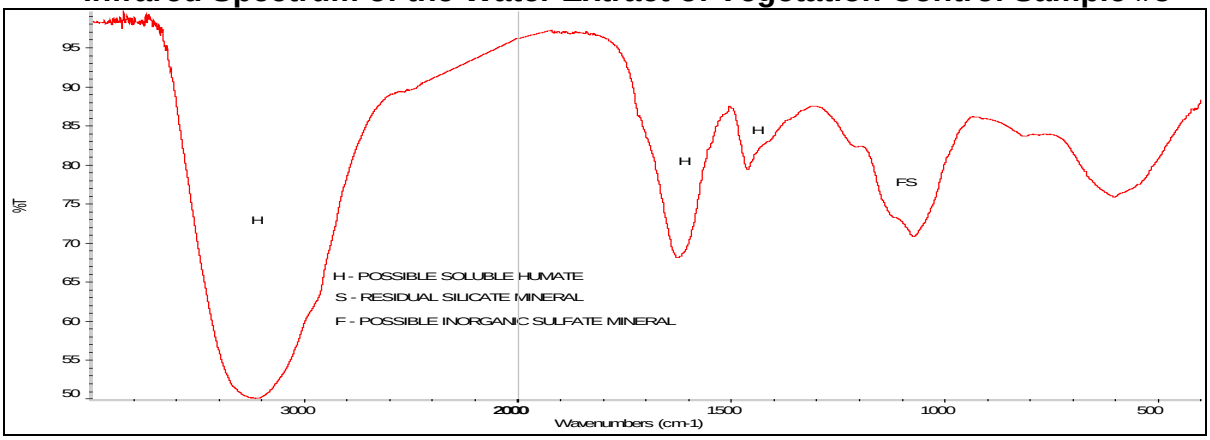
Two infrared spectra taken of the 'as received' vegetation sample are similar to each other. They show typical celluloidal material, silicate mineral (dirt) and calcium carbonate mineral. Some long chain natural ester is indicated. One spectrum shows more mineral 'dirt' matter (calcium carbonate and quartz) than the other. The spectra follow.

Infrared Spectra of the 'As Received' Vegetation Control Sample #5



A water extract of the control vegetation shows natural products which consist of possibly a soluble humate (fulvic acids), possible inorganic sulfate mineral and residual (colloidal) silicate mineral fines that could not be filtered out. The spectrum follows.

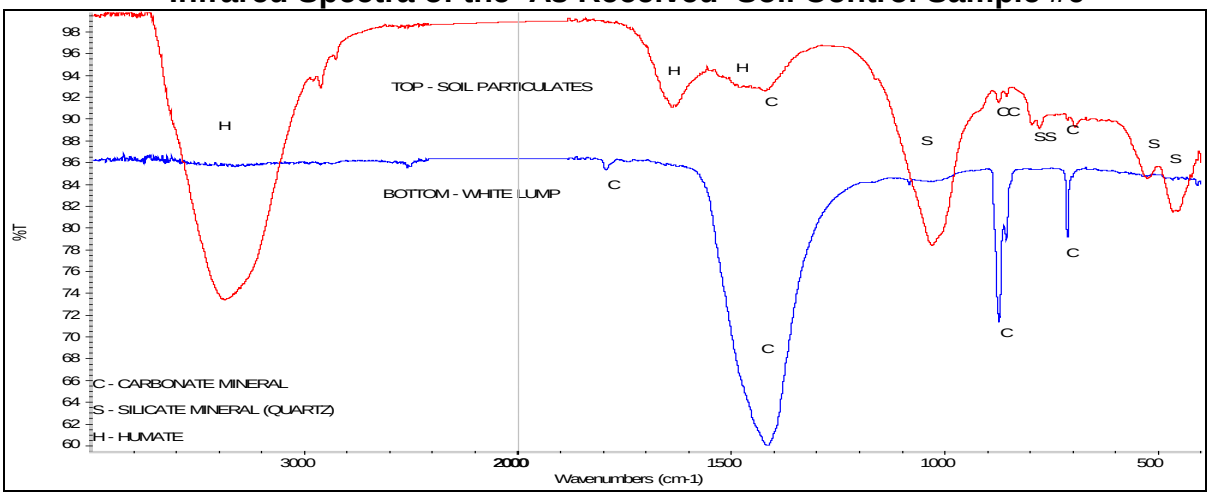
Infrared Spectrum of the Water Extract of Vegetation Control Sample #5



Control Soil Sample #6

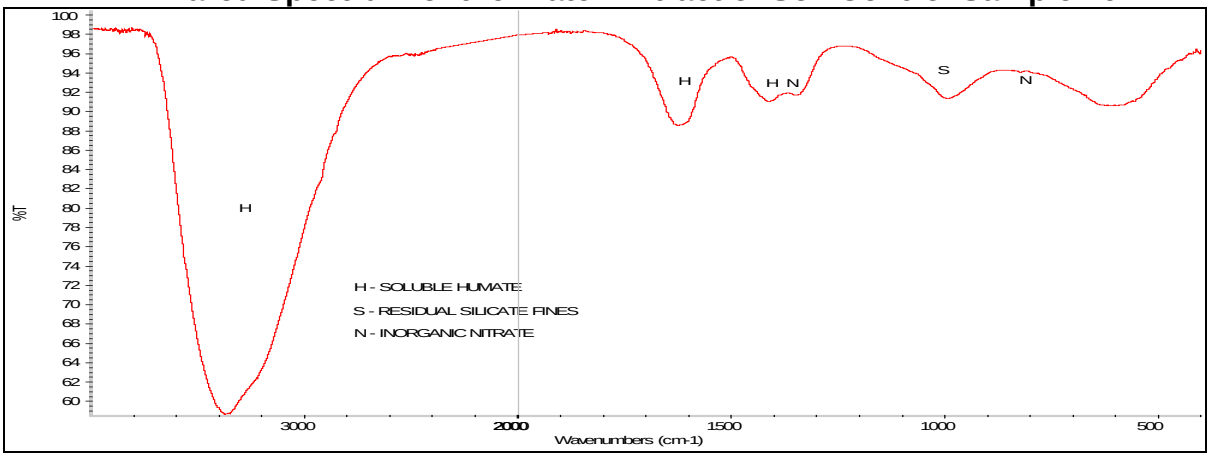
The control soil consists of particulates and white lumps. An infrared spectrum acquired from the 'as received' soil particulates shows typical components of silicate mineral (quartz), humate, and some carbonate mineral. The lump is totally calcium carbonate. The spectra follow.

Infrared Spectra of the 'As Received' Soil Control Sample #6



An infrared spectrum of the water extract of the control soil sample shows expected natural products, such as possible humate (fulvic acids) and residual silicate fines, which could not be filtered out. Additionally, there is indication of inorganic nitrate. Following is the spectrum.

Infrared Spectrum of the Water Extract of Soil Control Sample #6

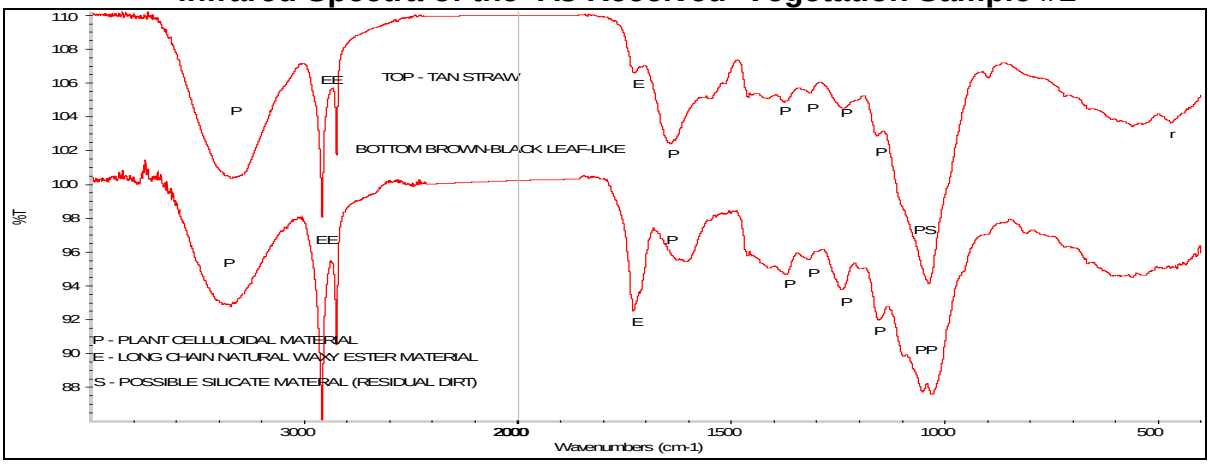


Trace Evidence from A Site ('Bleached')

Site A Vegetation Sample #1

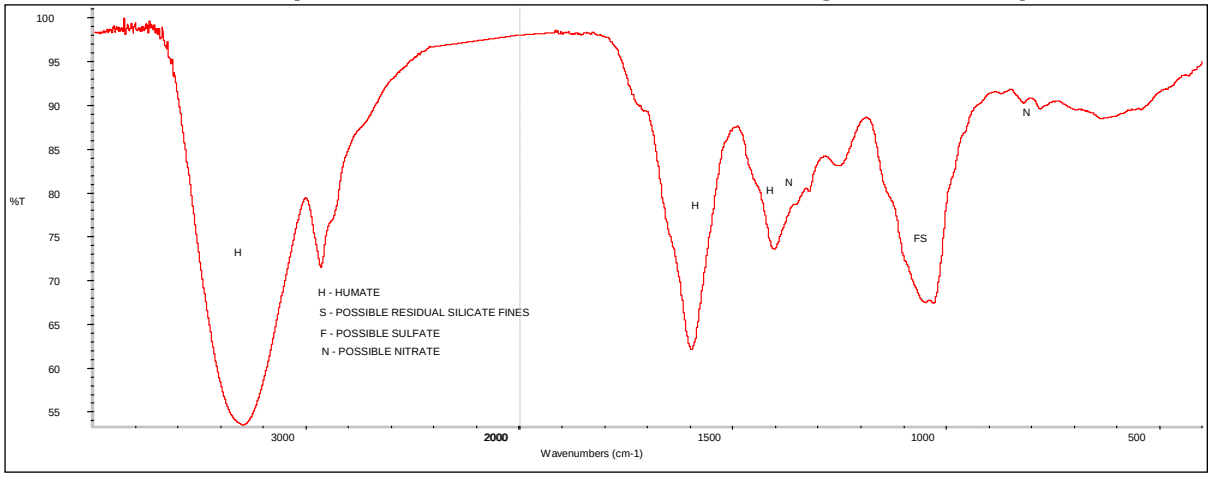
Infrared analysis of the vegetation from site A expectedly shows a predominating grass celluloidal structure. There is some long chain natural ester and residual silicate (dirt). Nothing different from the control vegetation is noted. Following are the spectra.

Infrared Spectra of the 'As Received' Vegetation Sample #1



The infrared spectrum of the vegetation water solubles is similar to that of the control vegetation water solubles, showing humate and residual silicate and possible sulfate minerals. Additionally, some nitrate may be present, but not confirmed. The spectrum follows.

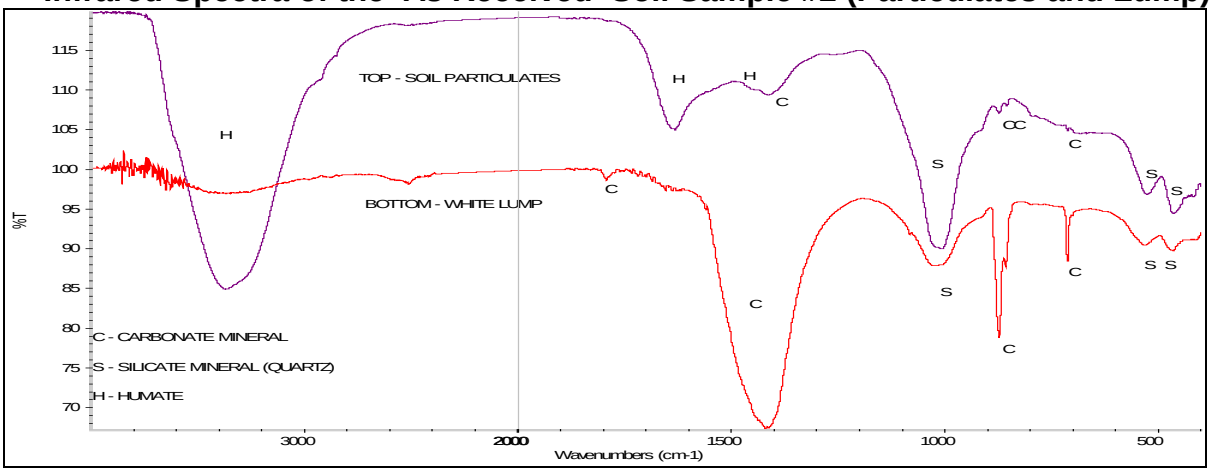
Infrared Spectrum of the Water Extract of Vegetation Sample #1



Site A Soil Sample #2

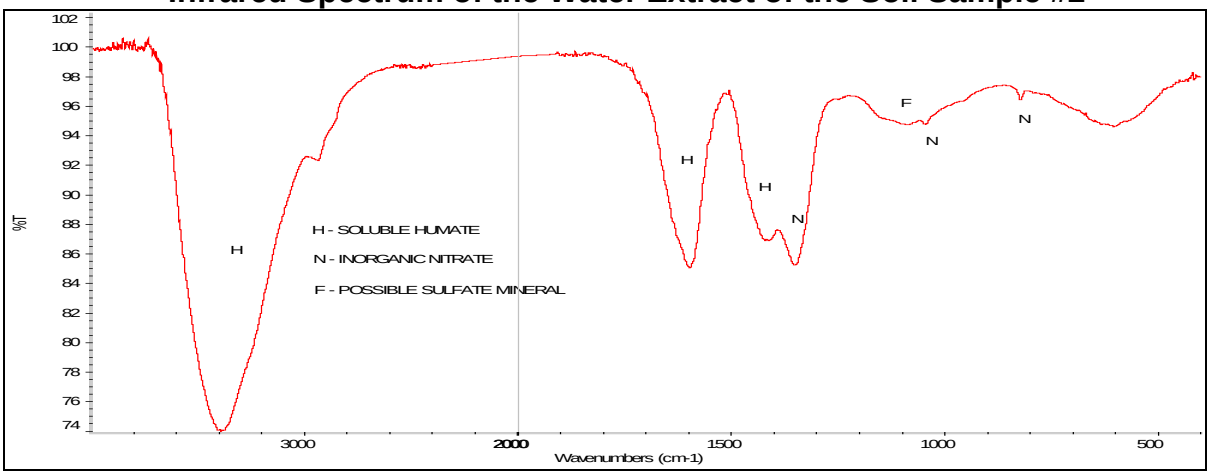
The #2 site A sample consists of soil particulates and white lumps like the control. Spectra were acquired from the particulates and the lump. They show the soil is normal, and compare to those of the control. That is, the spectrum of the soil particulates detects silicate mineral (quartz), humate, and carbonate mineral. The spectrum of the lump shows only calcium carbonate. Following are the spectra.

Infrared Spectra of the 'As Received' Soil Sample #2 (Particulates and Lump)



The spectrum of water soluble extract from the #2 soil sample is similar to that of the control. It shows the expected water soluble humate (fulvic acids). However, there is a prominent amount of inorganic nitrate. This is only indicated in smaller amounts in the control. The spectrum follows.

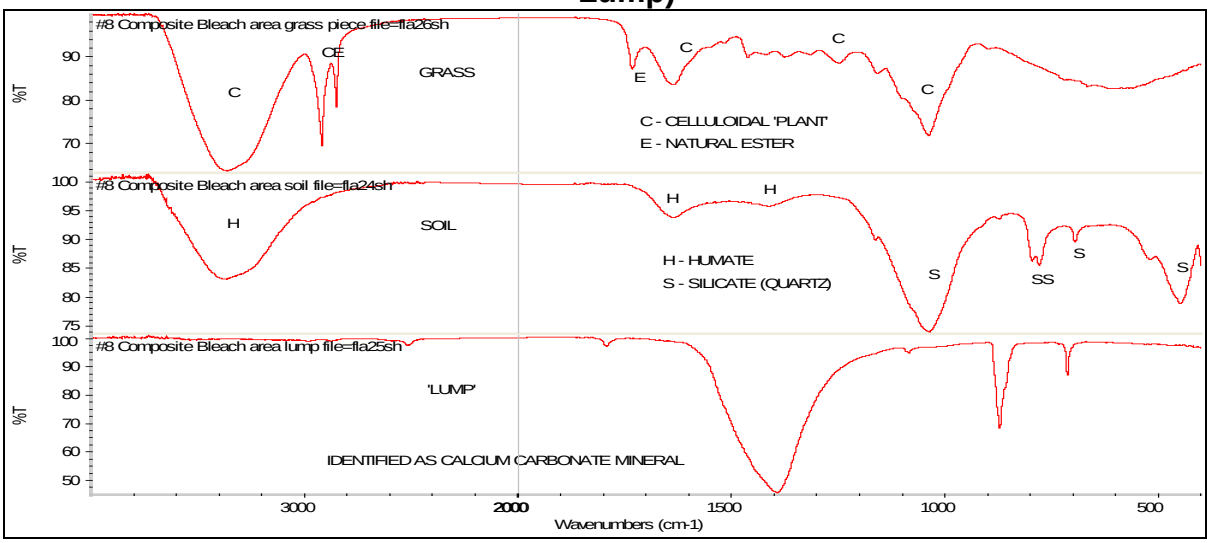
Infrared Spectrum of the Water Extract of the Soil Sample #2



Site A Composite Sample #8

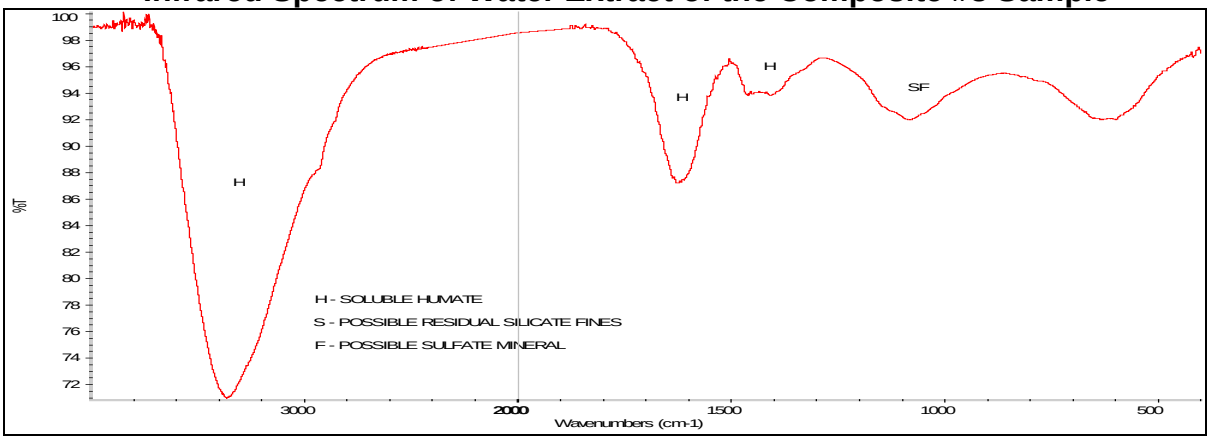
Analyses of the composite soil, 'lump ', and grass show nothing unusual. The spectrum of the 'as received' grass shows normal celluloidal 'plant' material and some long chain natural ester. A spectrum of the soil displays silicate (quartz) and humate material. The spectrum of the lump shows it is calcium carbonate mineral. Following are the spectra.

Infrared Spectra of "As Received' Composite Sample #8 Particulates (Grass, Soil, Lump)



The spectrum of water solubles compares to those from the control. It shows normal environmental material which includes humate and possible silicate mineral and/or sulfate mineral. The spectrum follows.

Infrared Spectrum of Water Extract of the Composite #8 Sample

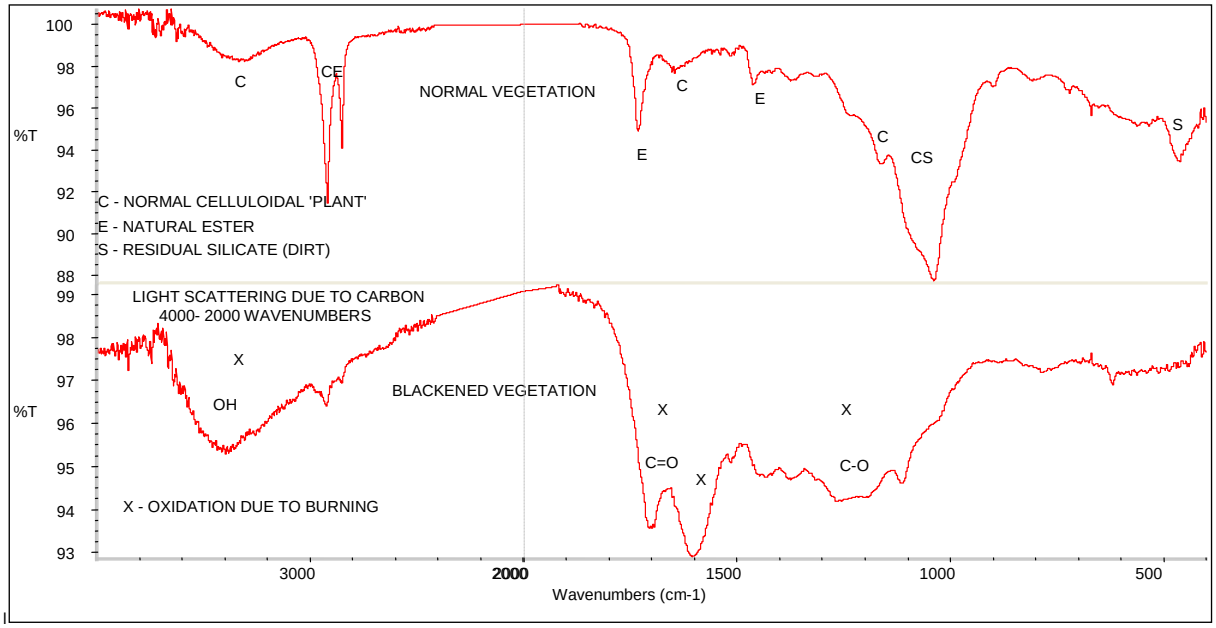


Trace Evidence from B Site ('Burned')

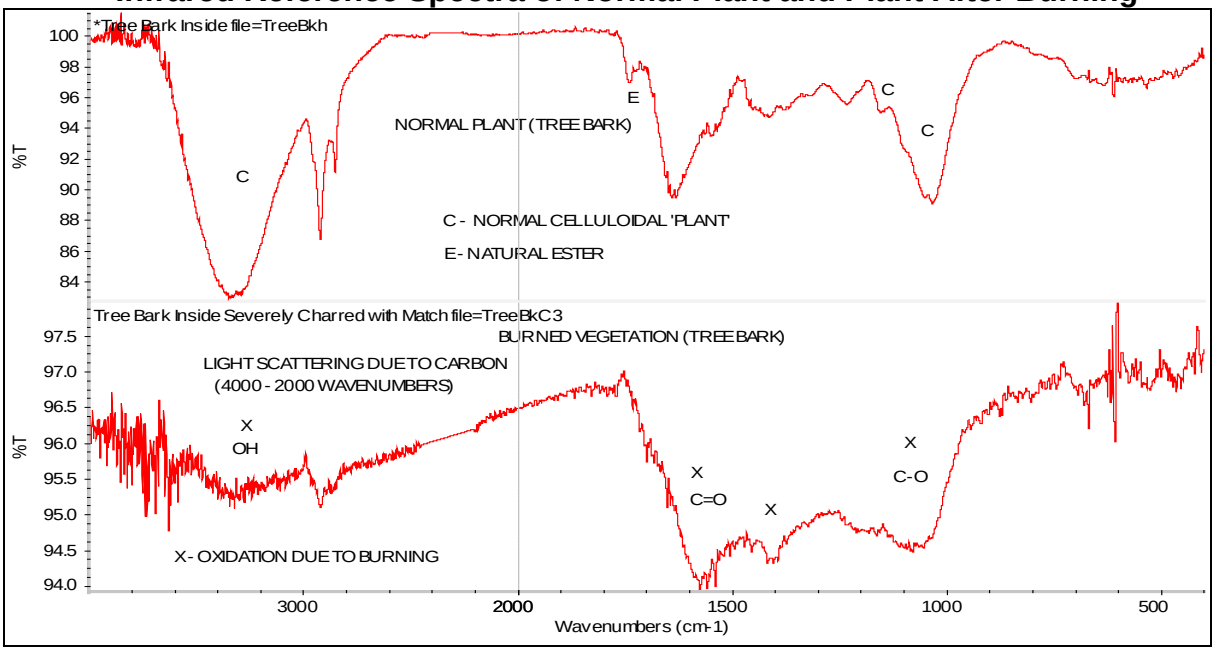
Site B Vegetation Sample #3

The vegetation sample #3 visually appears to have burned grass. Infrared analysis of the 'as received' vegetation shows the burn areas of the grass are indeed burned. That is, the spectrum is different from normal appearing areas of the grass. The spectrum of the black area shows typical oxidation bands resulting from burning. There is some light scattering from 4000 to 2000 cm^{-1} which is typical of carbon, a product of burning. This spectrum compares to a reference spectrum of burned wood. Following are spectra of the black vegetation and the normal vegetation. References of normal plant (wood bark) and burned plant (wood bark) ae included for comparison.

Infrared Spectra of the 'As Received' Vegetation Sample #3

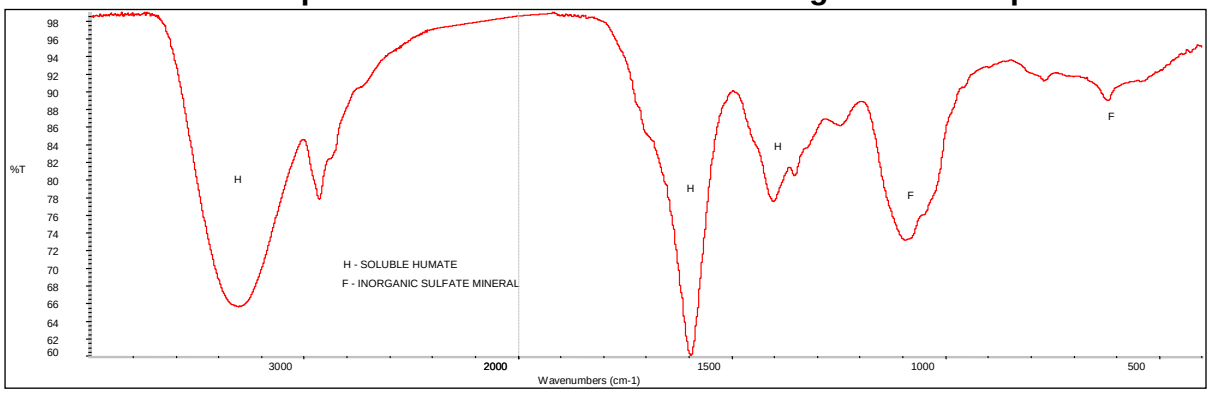


Infrared Reference Spectra of Normal Plant and Plant After Burning



The infrared spectrum of the water solubles from the #3 vegetation shows nothing unusual. It is similar to the spectrum of the control water solubles, showing typical components of soluble humate (fulvic acids) and inorganic sulfate mineral. Following is the spectrum.

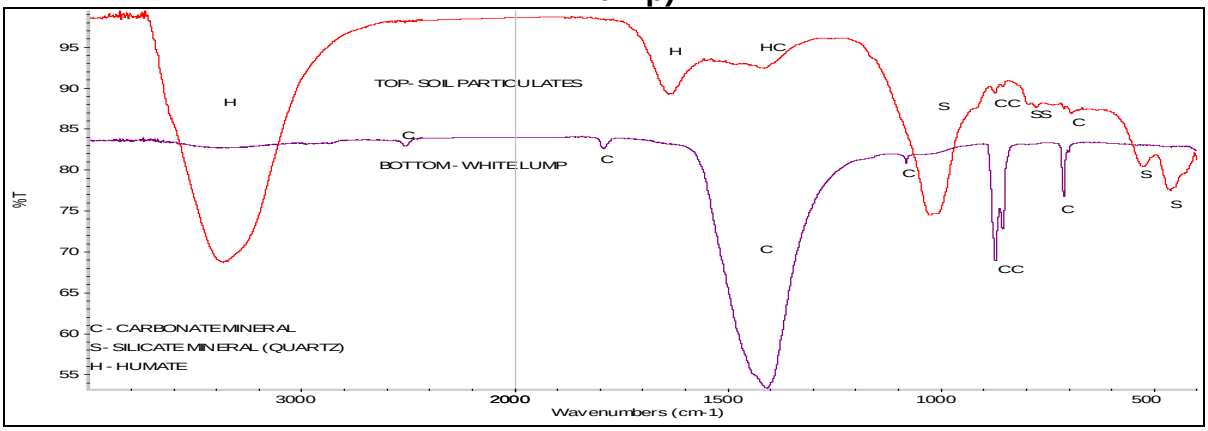
Infrared Spectrum of Water Extract from Vegetation Sample #3



Site B Soil Sample #4

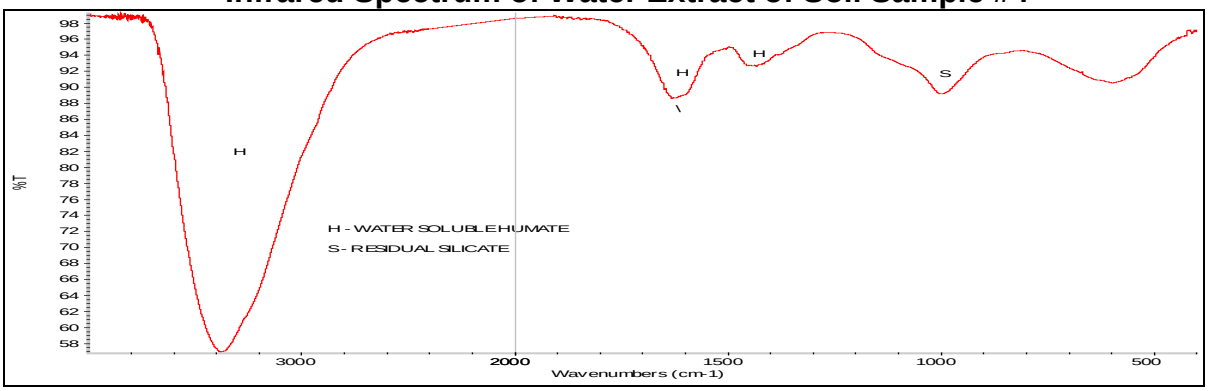
The site B soil sample consists of brown particulates and white lumps like the control and site A samples. The spectra of the 'as received' soil from site B show it is normal. They compare to spectra from the control soil. A spectrum of the brown particulates indicates typical components of silicate mineral (quartz), humate, and carbonate mineral. The spectrum of the lump displays only calcium carbonate. The spectra follow

Infrared Spectra of the 'As Received' Soil Sample #4 (Particulates and White Lump)



The spectrum of water solubles from the soil compares to that of the control, showing soluble humate (fulvic acids) and residual silicate fines that could not be filtered out.

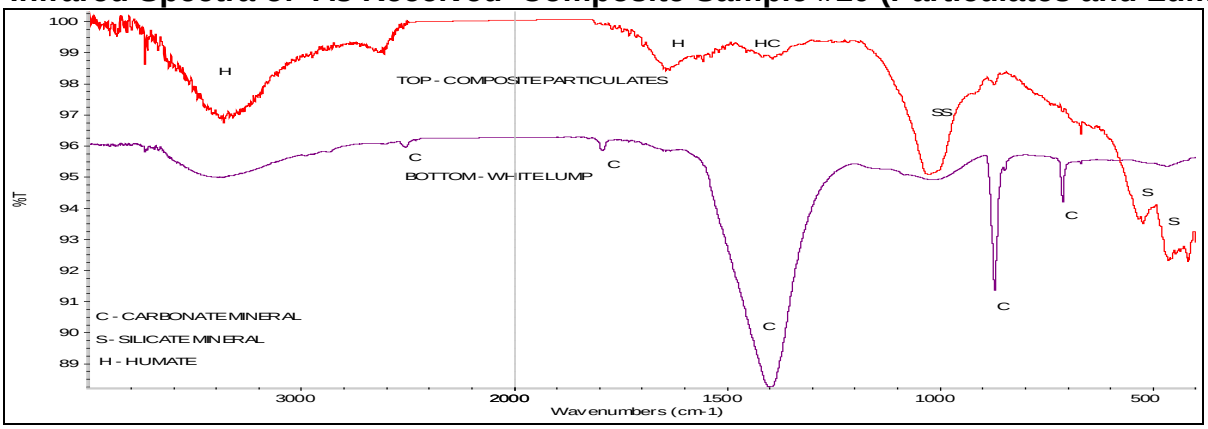
Infrared Spectrum of Water Extract of Soil Sample #4



Site B Composite Sample #10

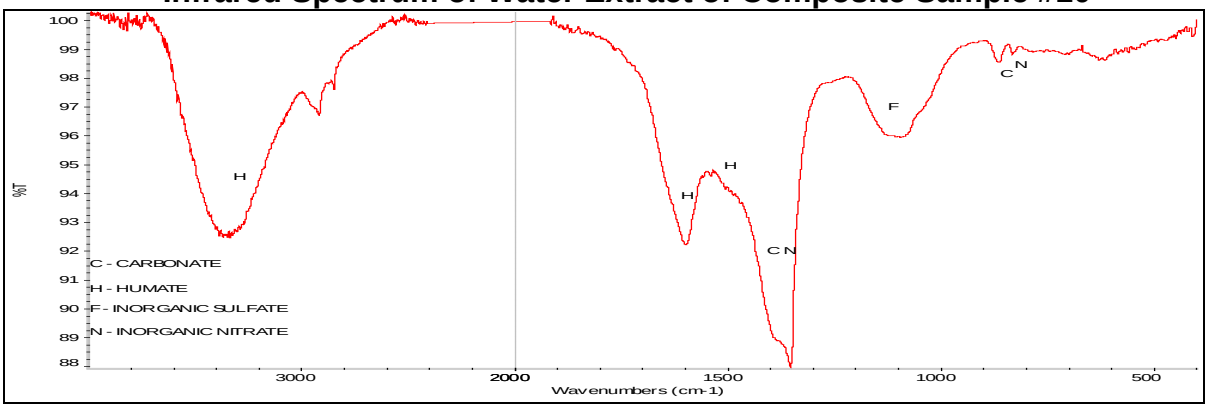
This sample consists of grass, soil and lumpy material. The composite sample ‘as received’ appears normal, and infrared spectra compare to those from the control soil. The infrared spectrum of the soil particulates displays humate and silicate mineral. The spectrum of the lump identifies calcium carbonate mineral. The spectra follow.

Infrared Spectra of ‘As Received’ Composite Sample #10 (Particulates and Lump)



The spectrum of the water extract from the composite shows inorganic nitrate, humate (probably fulvic acids), carbonate and sulfate minerals. The concentration of nitrate is higher than in other samples. It is speculated that the nitrate could be from fertilizer. Another possibility is that if the sphere had an ionizing energy field around it, then interaction with the air may have produced nitrates. Following is the spectrum.

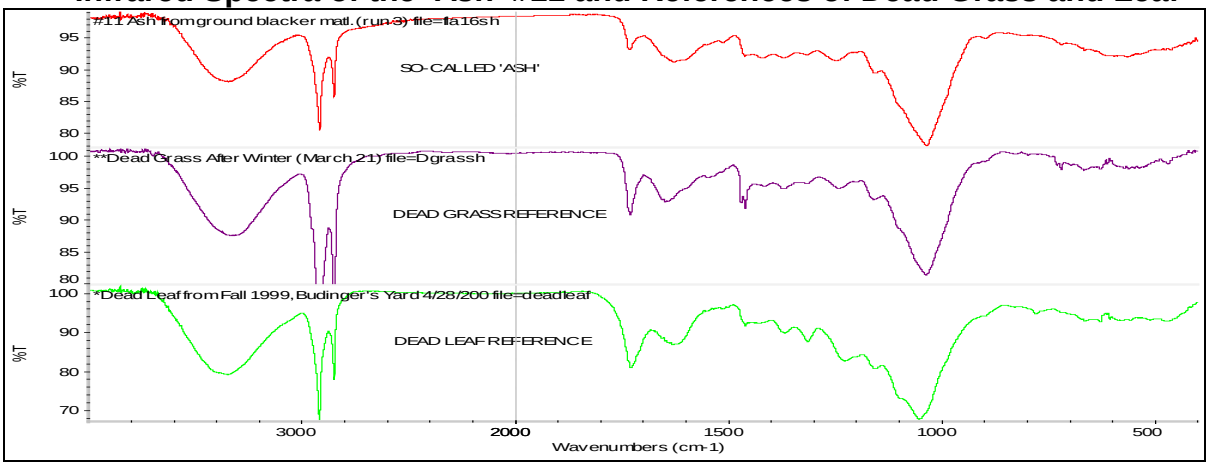
Infrared Spectrum of Water Extract of Composite Sample #10



The 'Ash' #11

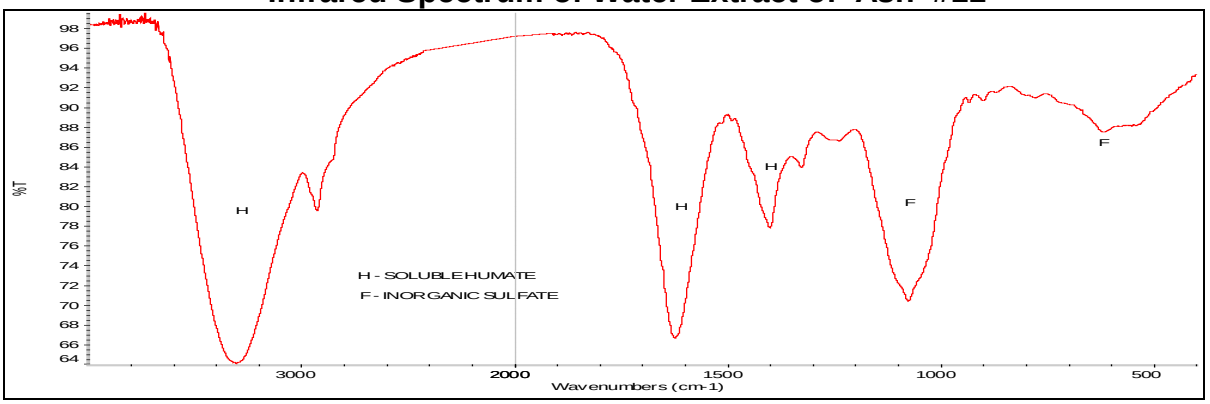
Several spectra were obtained from the 'as received' so-called 'ash'. The spectra are identical to each other and show the material is not 'ash' but plant fines. The spectra are typical of celluloidal material which composes plant/grass. Following is a representative spectrum with references of dead grass and leaf for comparison.

Infrared Spectra of the 'Ash' #11 and References of Dead Grass and Leaf



Infrared analysis of a water extract shows the normal expected products of a humate and inorganic sulfate. The spectrum follows.

Infrared Spectrum of Water Extract of 'Ash' #11



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