

Frontier Analysis, Ltd

TECHNICAL SERVICE RESPONSE NO.: UT036

Subject: Analysis of Fluorescing Skin and Fingernails from a UFO Abduction Victim

Date: July 27, 2004

Requested By: Derrel Sims
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Background/Objective:

The background of the abduction event such as exact time, location, and other details were not provided to this analyst. The approximate time of the event was circa late 2003. After the abduction, areas of her body were noted to fluoresce when exposed to a UV lamp. Five samples (four skin scrapings from various areas and one set of fingernail clippings) were submitted for analysis of the material responsible for the fluorescence.

Conclusions:

- 1.) Skin samples were on mending tape, which caused considerable interference with the analysis. One foreign material is present and is speculated to be an alkyl aryl sulfonate. This material would fluoresce. However, it is probably a contaminant. This material is commonly used in laundry detergent.
- 2.) The fingernail clippings could easily be plucked from the mending tape adhesive before analysis. Therefore, with less tape interference two foreign materials were detected. One is possibly alkanolamide, which is commonly used where detergent properties are required. The other is identified as cellulose nitrate. This material has many uses, such as "fast -drying automobile lacquers, high explosives, collodion, rocket propellant, print ink base, flashless propellant

powder, coating bookbinding cloth, leather finishing, manufacture of "Celluloid."¹
Both of these components could be contaminants.

3.) The identity of the material causing the fluorescence is not proven. This is not surprising, because it generally only takes a few ppm (part per million) of material for observance of fluorescence or to produce color in a sample. So without a concentration procedure the material is probably at such low concentration to render it undetectable by most tests.

4.) The information provided in this analysis will be compared to residues found after other abductions. This laboratory is already examining other samples from similar events. Perhaps more resolved spectral data will be generated and compare to some of the data suggested in this analysis. It is hoped a pattern will emerge which will provide more information on abductions; perhaps even purpose.

5.) It is suggested that, if possible, any future samples be submitted as scrapings on a glass slide, a razor blade, aluminum foil, or other small glass containers rather than mending tape. The tape severely contaminates the samples to the extent that it is probably at least 100-fold higher in concentration than that the actual fluorescing material. Other sampling techniques are being investigated to isolate/concentrate the fluorescing material for identification. Possibly even swabbings of the skin with various solvents may be employed.²

Procedure:

The samples were received with the following identification

- Right palm scrapings on mending tape.
- Back scrapings on mending tape.
- Sample #1 on mending tape; no further information.
- Sample #2 on mending tape; no further information.
- Fingernail clippings on mending tape.

Skin Samples: Generally one to five infrared spectra were obtained per sample. The data were obtained on the Nicolet Avatar 360 spectrometer using the Harrick

¹ Richard J. Lewis Sr., "Hawley's Condensed Chemical Dictionary", Fourteenth Edition, John Wiley & Sons, Inc., New York, 2001.

² Cotton ball swabbings with pentane (lighter fluid) followed by acetone (nail polish remover) are currently being examined from a recent event. But this requires a rapid reporting of the event to the analyst by the abductee.

SplitPea™ which is a single pass ATR (Attenuated Total Reflectance) sampling accessory. By this sampling technique surface spectra can be obtained of the skin materials adhering to the mending tape. Additionally, difference spectra were generated between the original data and a mending tape spectrum taken from the adhesive side. This was done to null out the interfering absorption from the tape. Then for selected samplings a second generation of difference spectra were generated between the first difference spectra and a reference spectrum of human skin. In this way interfering skin absorption was nulled out. The remaining absorption should be due mostly to foreign material and probably some artifacts from the excessive computer massaging.

Fingernail samples: These were easier to examine by infrared spectroscopy. The clippings were easily removed from the mending tape with a tweezers. Five spectra were obtained from the surfaces of the nails with minimal interference from the tape. So, these samples required less spectral computer massaging. However, difference spectra were generated between these original data and a human fingernail reference to null out the interfering fingernail keratin.

Microscope photographs were obtained of all samples using the Leika GZ6 stereomicroscope interfaced to a Kodak digital Science MDS 120 camera.

Results:

The results of the individual tests done on the samples follow. These results are summarized in the conclusions section on the pages one and two of this report.

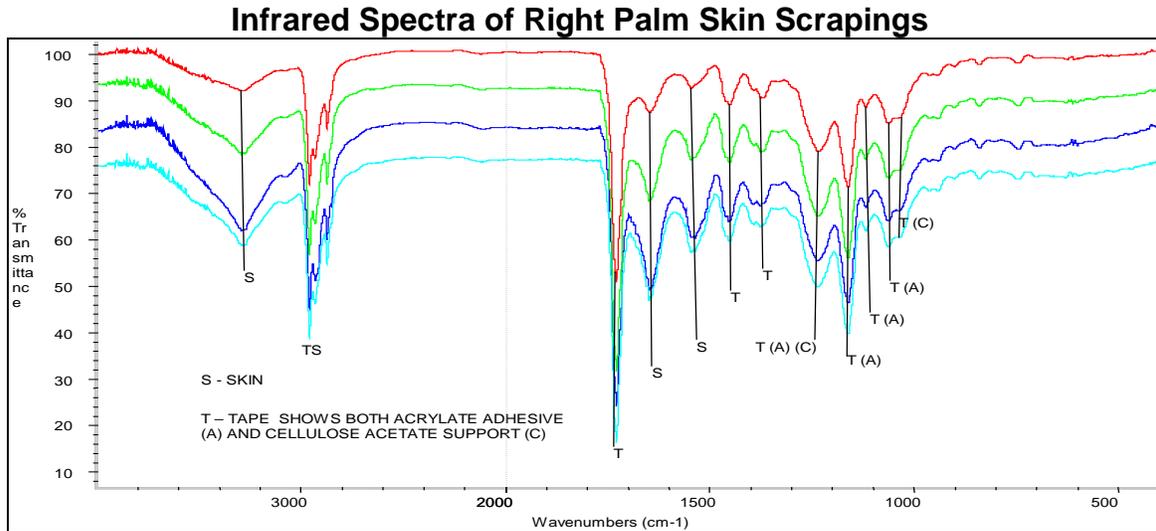
Right Palm Skin Scrapings

Microscopic examination of this skin scraping on adhesive side of the mending tape show typical skin cells with no unusual features. A photograph follows.

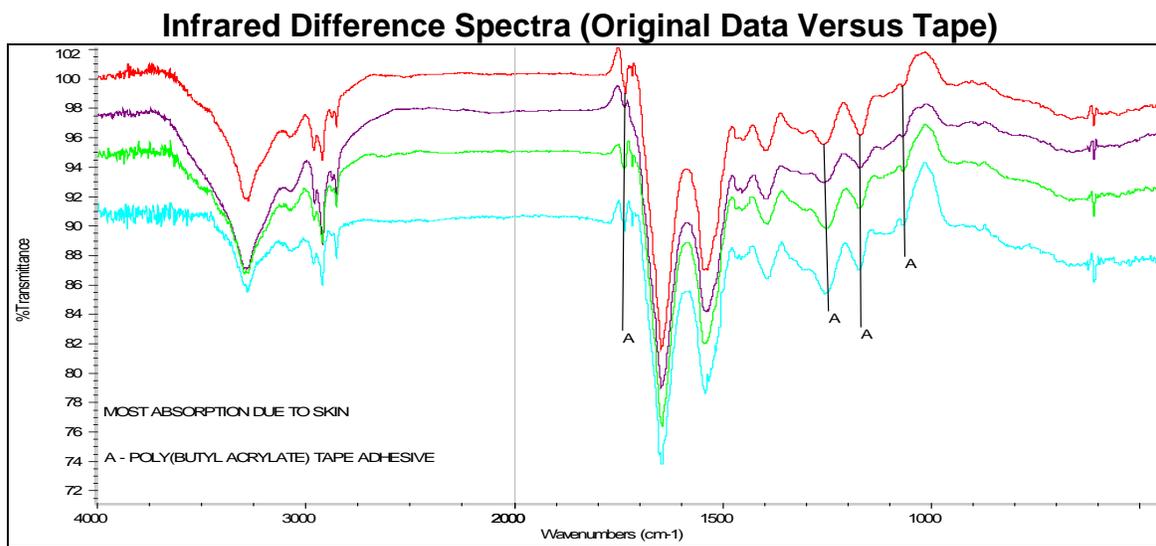


Four infrared ATR spectra were obtained from the “as received” right palm skin scrapings adhering to sticky side of the tape. The surface spectra show primarily mending tape (both polyacrylate adhesive and cellulose acetate support) and

human skin. Mending tape and human skin spectral references can be found in the appendix for comparison. Also included are commercial references of cellulose acetate and poly(butyl acrylate), the components of the tape. The spectra follow with labeled peaks.

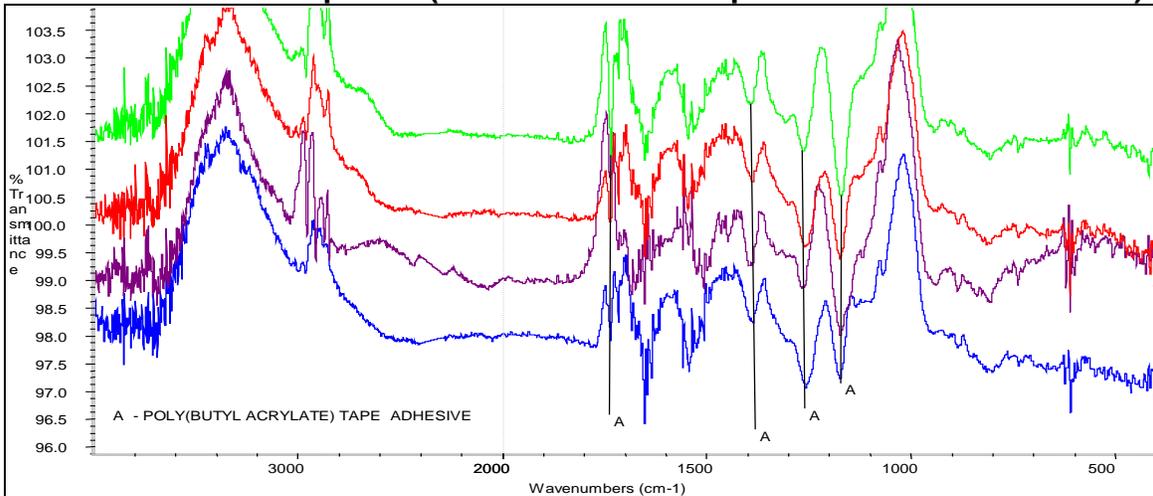


The tape absorption was nulled out by generating difference spectra between the above spectra and a reference of tape absorbance. Primarily absorption showing a secondary amide remain. These are typical of skin protein peptide linkages from human skin. Some weak absorbance in some instances indicates small amounts of poly(butyl acrylate) adhesive from the mending tape. The tape adhesive was not fully nulled out. (This is due to the contact differences between the tape reference and sample spectrum on the ATR crystal during the data acquisition.) These first generation difference spectra follow.



A second set of difference spectra was generated to null out the interfering skin, i.e. a reference spectrum of human skin was subtracted from the above difference spectra. Caution in interpretation should be especially exercised at this point because this amount of spectral massaging is bound to produce anomalies/artifacts which are difficult to differentiate from real peaks. However, it is obvious that the excess absorption designated in the spectra below is real and is due to an enhancement of the above mentioned poly(butyl acrylate) tape adhesive peaks. No other components are detected.

Infrared Difference Spectra (Above Difference Spectra Versus Human Skin)



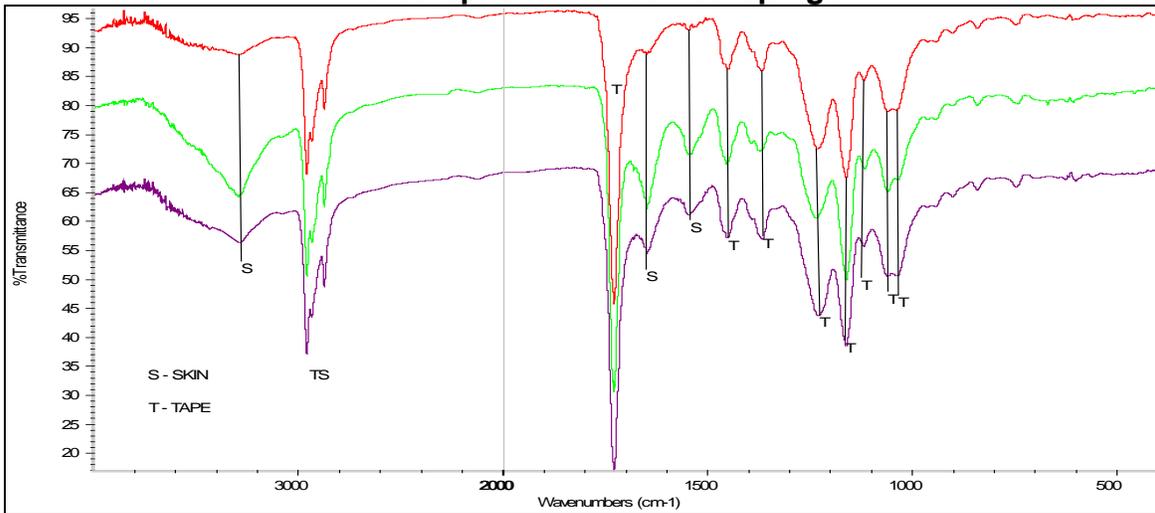
Back Skin Scrapings

Microscopic photographs taken from the skin scrapings on the adhesive of the mending tape are typical of skin cells. The photograph follows.



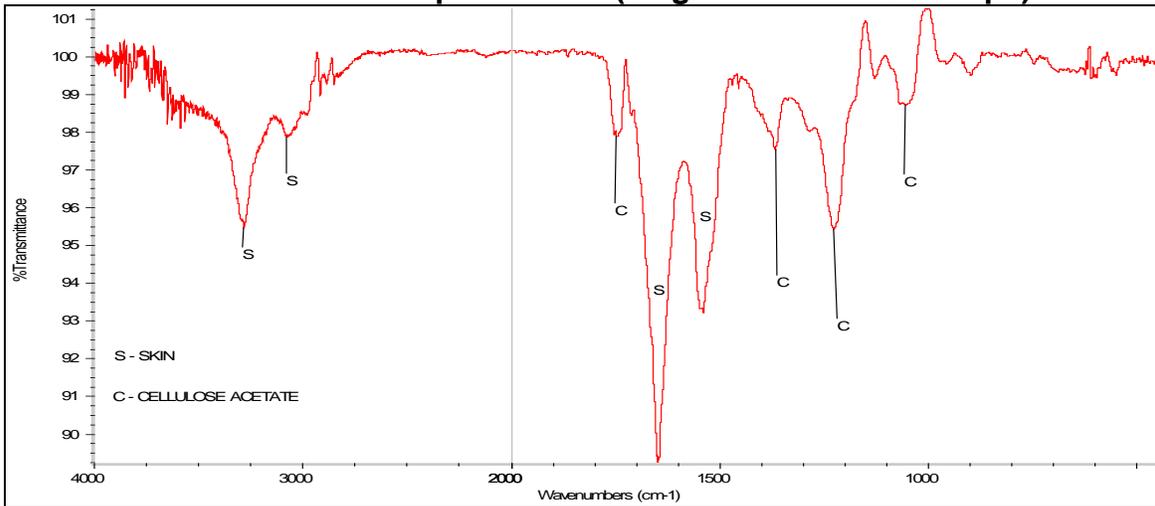
Three infrared spectra were obtained from the back scrapings on the tape. The tape again proved to be a hindrance. It significantly interfered with pertinent bands from the skin and possible other components adhering to it. The spectra show predominantly tape and some human skin. Following are the spectra.

Infrared Spectra of Back Scrapings



The tape components were nulled out on two of the above spectra. It was not worth looking at the third top spectrum (red) because very little skin absorption is present. It is mostly tape. The difference spectra slightly varied between the subtractions. The first spectrum shows skin and cellulose acetate. The latter is the tape support. (The tape support appears due to a contact difference of the sample and the tape reference on the ATR crystal. More poly(butyl acrylate) adhesive absorption was nulled out than the cellulose acetate support.) A reference spectrum of cellulose acetate is in the appendix for comparison.

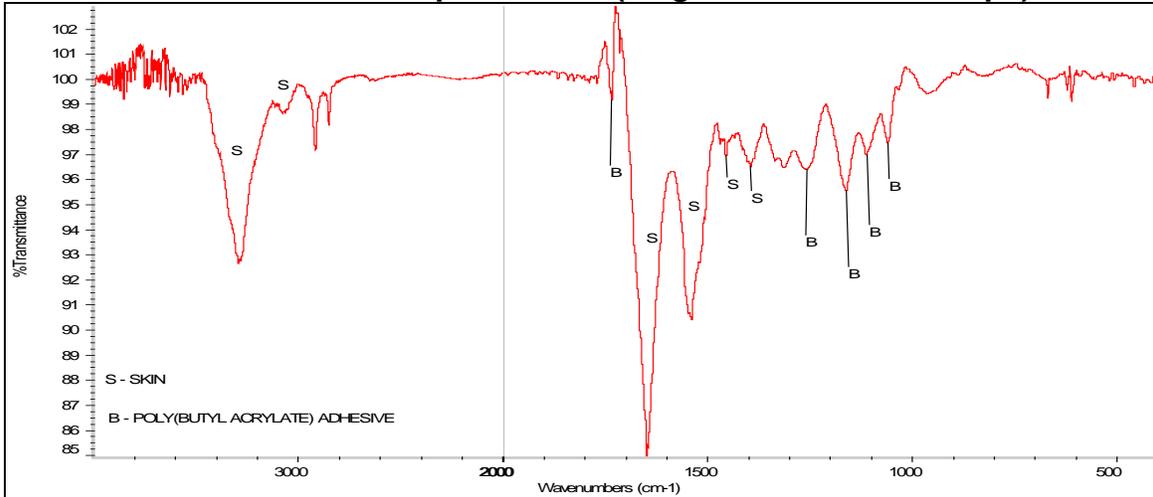
Infrared Difference Spectrum #1 (Original Data Versus Tape)



The second difference spectrum shows additional absorption due to poly(butyl acrylate). The tape adhesive in this acquisition was not fully nulled out. (As previously indicated there are ATR contact differences between the tape reference and sample spectrum during the data acquisition. In this case more

cellulose acetate tape support was nulled out than the acrylate adhesive.) No other components are detected. This spectrum follows.

Infrared Difference Spectrum #2 (Original Data Versus Tape)



Because of the tape interference problems, acquisition of a second generation of difference spectra was not pursued.

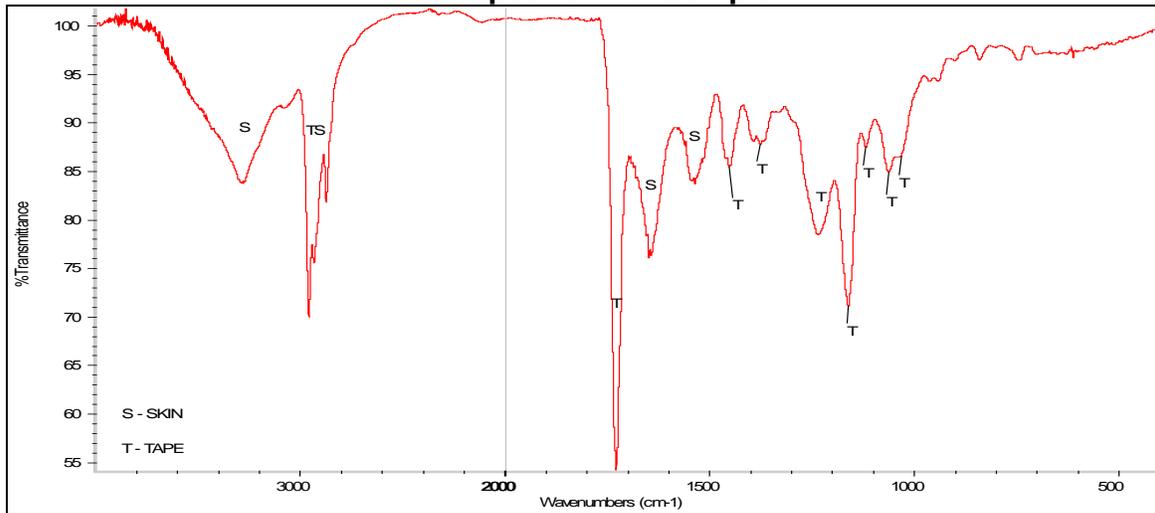
Sample #1

There was no identification supplied with this sample, and it was in very scant amounts. A microscopic picture shows the amount available for analysis.



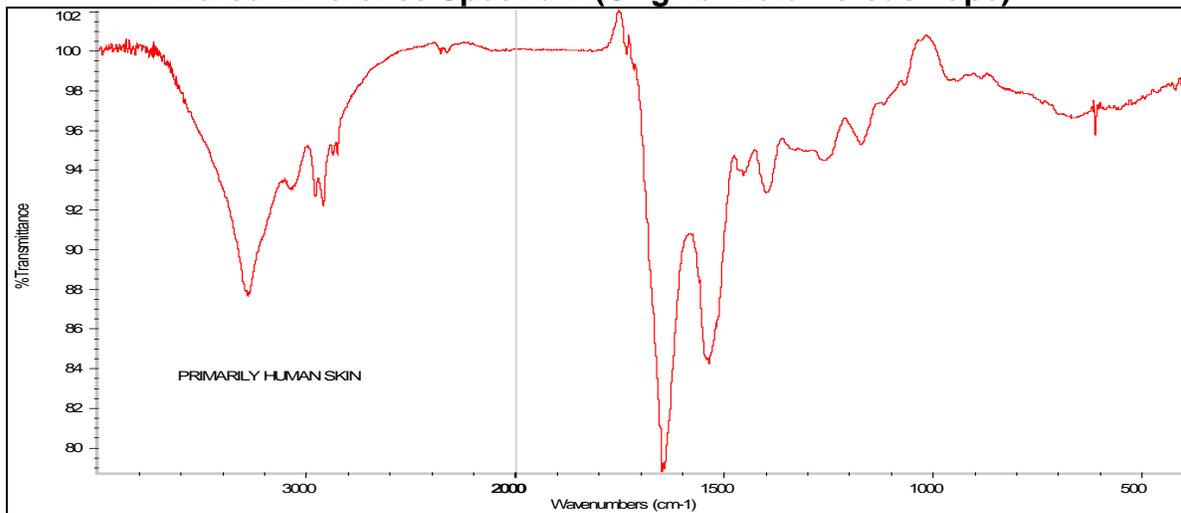
Because of the sample limitation only one infrared spectrum could be obtained. It shows tape components and skin as did the previous samples. The spectrum follows.

Infrared Spectrum of Sample #1



A difference spectrum generated between the sample spectrum and a tape reference shows skin. Following is the spectrum.

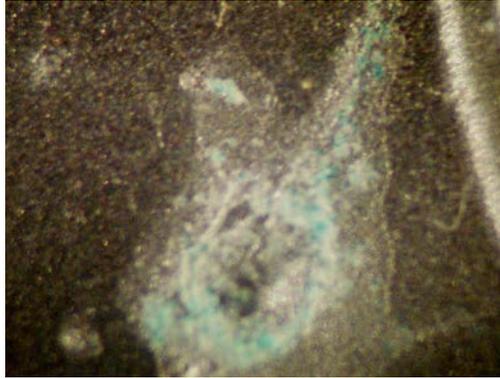
Infrared Difference Spectrum (Original Data Versus Tape)



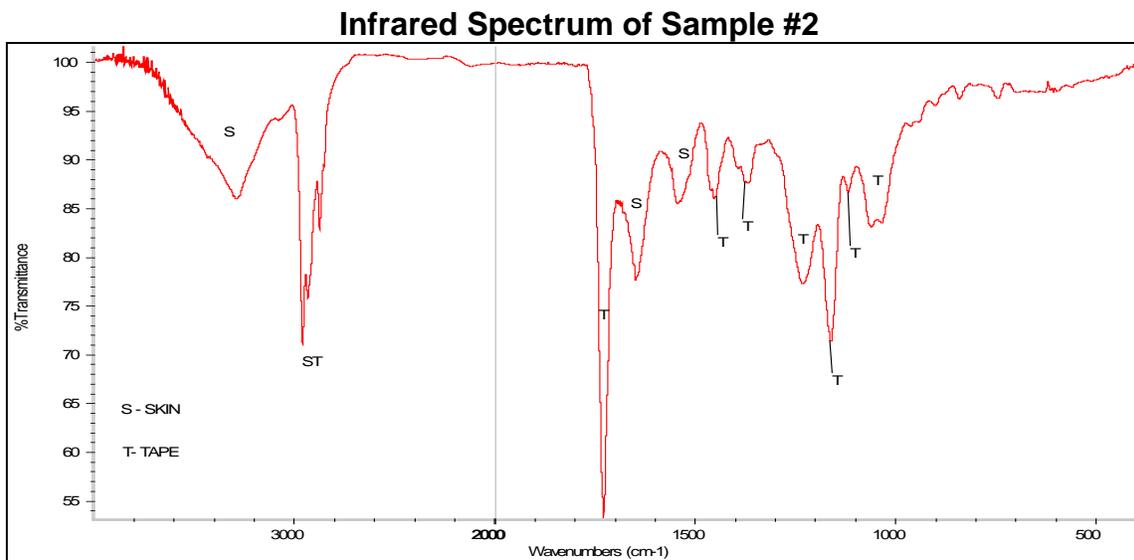
Another difference spectrum was generated between the above spectrum and a reference of skin. However, no additional information was obvious as in the previous skin samples. Any extra absorbance could be attributed to incomplete nulling of one of the tape components, the poly(butyl acrylate) adhesive, as observed in previous samples. Therefore, the spectrum is not shown.

Sample #2

This sample also has little background information and is in very scant supply for analysis. A microscopic photograph taken of the sample on mending tape is interesting because it shows a bluish material is present. A photograph follows.

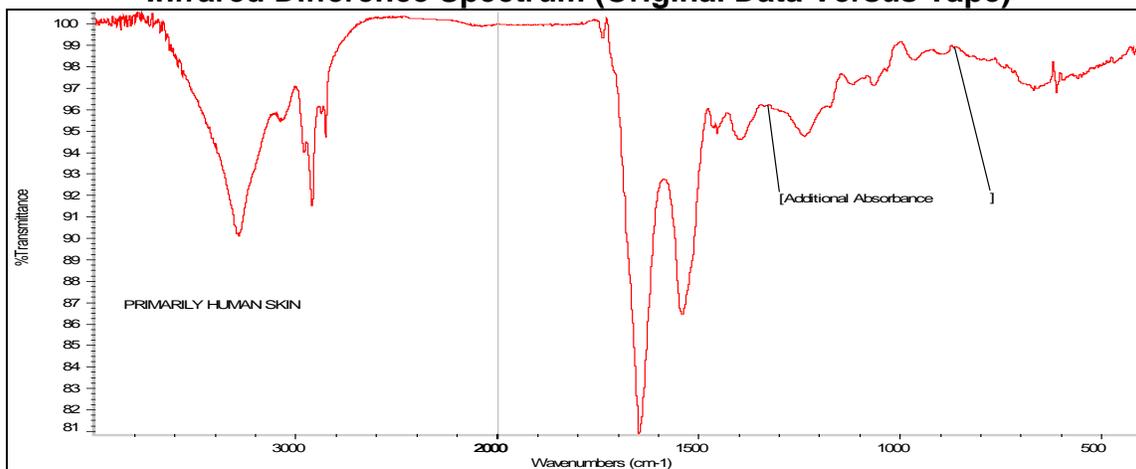


Sample limitations permitted only one infrared spectrum. The spectrum is typical of the data from the above skin samples. Only human skin and tape absorption are detected. Following is the spectrum.



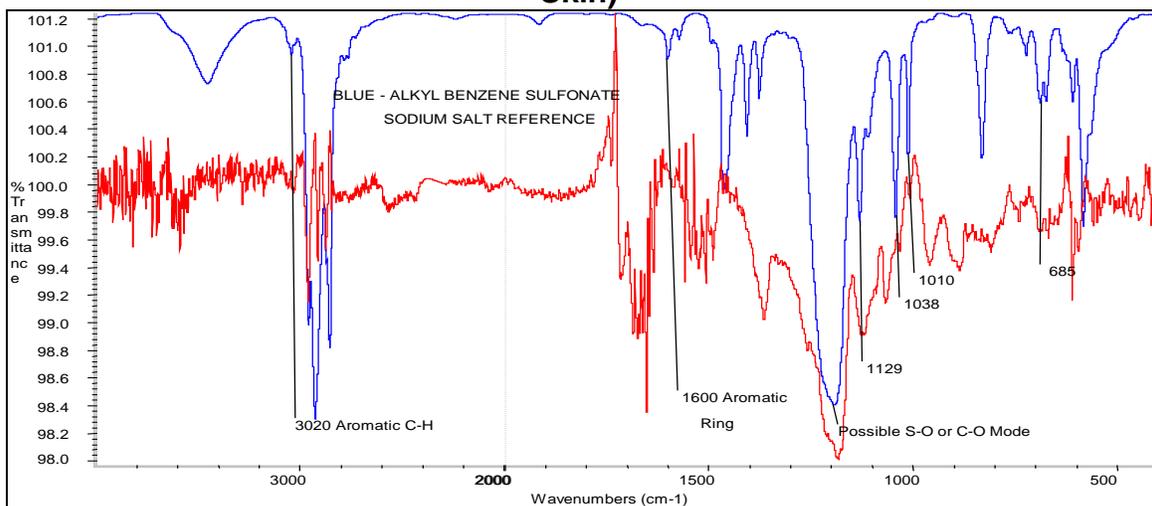
A difference spectrum generated between the sample spectrum and the tape reference shows primarily skin. Some additional absorbance is noted between 1300-800 cm^{-1} . The spectrum follows.

Infrared Difference Spectrum (Original Data Versus Tape)



Another difference spectrum was generated from the above data versus a human skin reference to null the skin absorbance. It was hoped this would resolve and better define the apparent additional absorbance seen between $1300-800\text{ cm}^{-1}$. Bands were enhanced in this area. The interesting ones are at 3020 cm^{-1} , 1600 cm^{-1} , 1193 cm^{-1} , 1129 cm^{-1} , 1038 cm^{-1} , 1010 cm^{-1} , and 685 cm^{-1} . These bands are very comparable to patterns produced by alkyl aryl sulfonates. Sulfonates are commonly used detergents and would cause fluorescence. This is a speculative identification, and the 1196 cm^{-1} band may also represent C-O absorbance. Again, as previously stated in this report, caution must be taken in this interpretation due to spectral artifacts, which may be produced by this amount of computer massaging. The spectrum follows along with a superimposed reference of an alkyl benzene sulfonate for comparison. The alkyl aryl sulfonate can also be found in the appendix.

Infrared Difference Spectrum (Above Difference Spectrum Versus Human Skin)



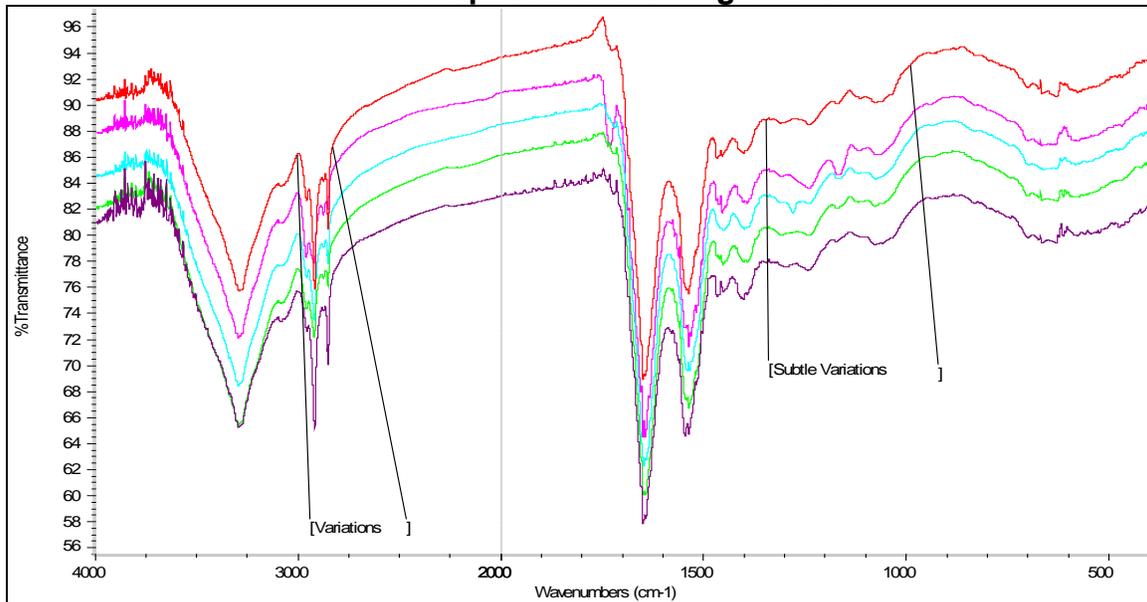
The Fingernails

Fingernail clippings examined under the microscope look normal. A microphotograph of a clipping taken through the mending tape follows.



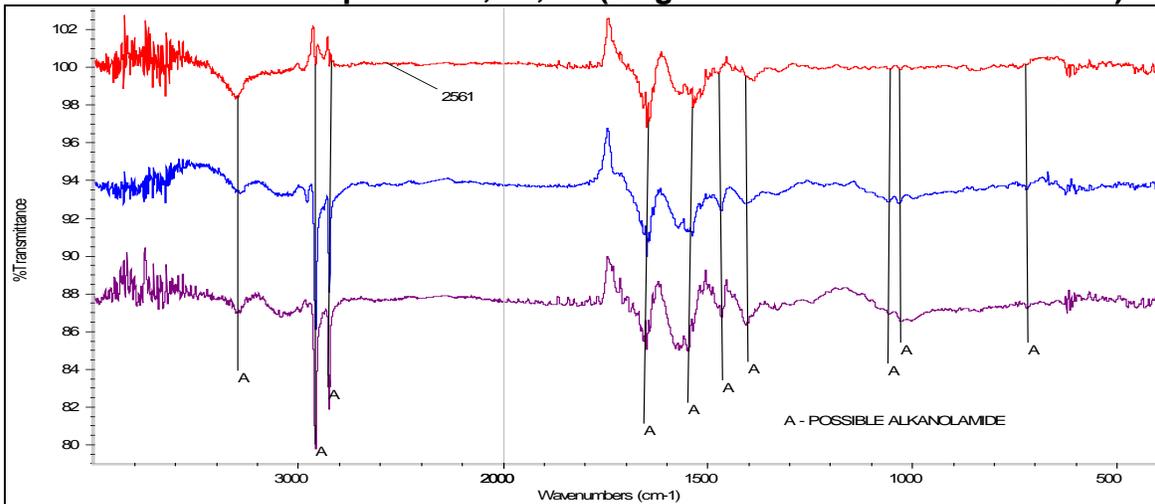
The advantage of this analysis is that the nail clippings could be removed from the tape and infrared spectra obtained without its interference. Five spectra were obtained. As expected, the spectra primarily show the keratin (protein-type) structure of fingernails. Weak absorbance variations due to trace amounts of other materials can be found in the spectra between $1300-900\text{ cm}^{-1}$ and between $3000-2800\text{ cm}^{-1}$ (the C-H stretch region). The spectra follow. A reference spectrum of a human fingernail can be found in the appendix.

Infrared Spectra of the Fingernails



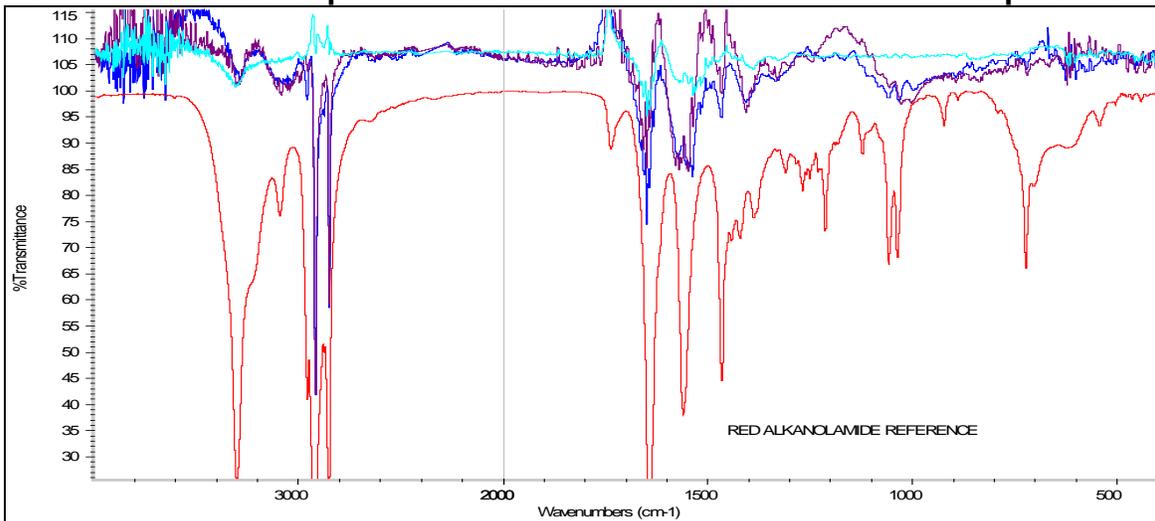
Difference spectra were generated between the above spectra and a human fingernail reference. This nulled out most of the keratin contribution to the spectra. All samples appear to contain an alkanolamide, though care should be taken in this interpretation because some of these extraneous appearing bands used in this evaluation may be artifacts. Another sampling was found to have residual poly(butyl acrylate) adhesive from the tape. The last sampling showed cellulose nitrate. It is suspected that these materials are contaminants. Following are three spectra that are similar to each other and appear to display an alkanolamide.

Infrared Difference Spectra #1, #2, #3 (Original Data Versus Human Skin)



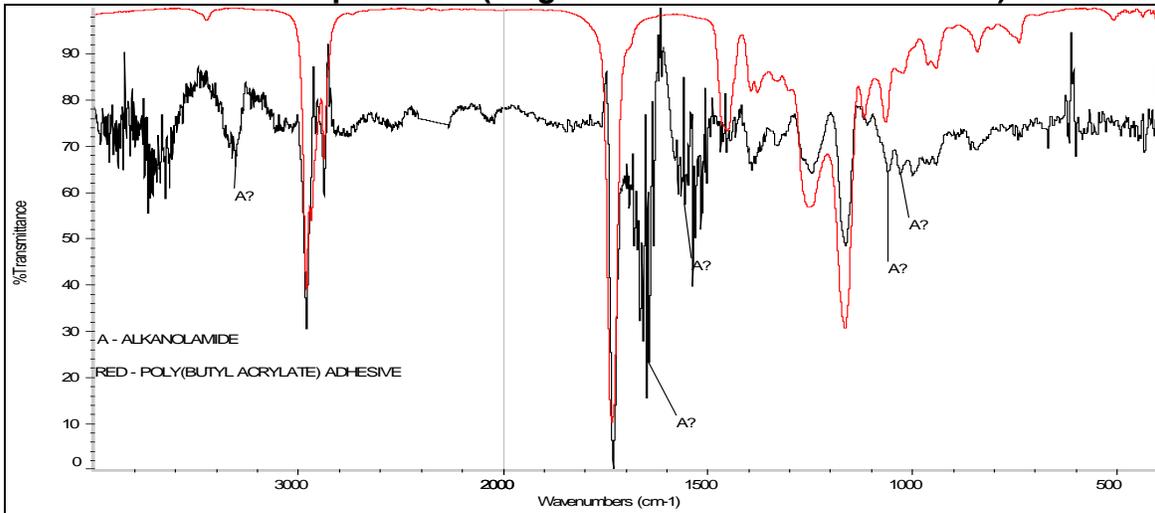
Following are the same spectra superimposed with a reference of an alkanolamide for easy comparison. This reference can also be found in the appendix.

Above Difference Spectra with Alkanolamide Reference for Comparison



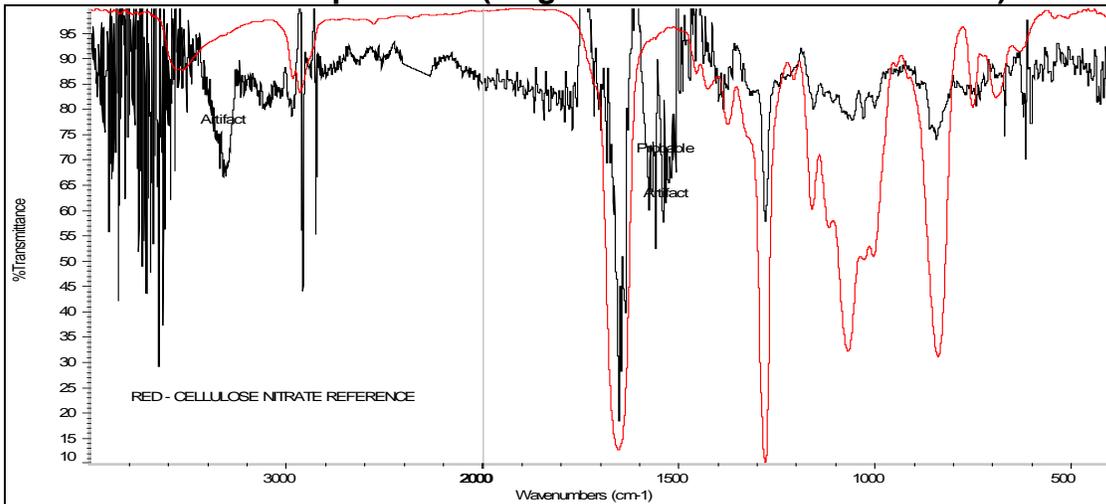
The next spectrum also suggests alkanolamide and also indicates residual poly(butyl acrylate) adhesive from the tape. This spectrum, along with a reference of poly(butyl acrylate) superimposed for easy comparison follows.

Difference Spectra #4 (Original Data Versus Human Skin)



The final spectrum identifies cellulose nitrate. There are many used for this material. They are listed in the conclusions section. A spectrum of this sampling along with a superimposed reference of cellulose nitrate is shown below. A reference of cellulose nitrate is also in the appendix.

Difference Spectra #4 (Original Data Versus Human Skin)



Phyllis A. Budinger

APPENDIX
Infrared Reference Spectra

