Frontier Analysis, Ltd

TECHNICAL SERVICE RESPONSE NO.: UT091

Subject: Analysis of a Fibrous Material Removed from an Experiencer's Shoulder (August 15, 2015, Northwestern, Pennsylvania)

Date: March 21, 2016

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Background/Objective:

A fibrous material was removed from the right shoulder blade of an Experiencer on August 15, 2015. From email exchanges this analyst understands that at least one other 'fiber' was pulled from the Experiencer's back in 2012. The object is to determine the composition of the specimen, and whether it could be related to an alien implant.

Conclusions:

•The specimen is not an alien implant. It is of plant origin and has a composition typical to splinter from a piece of wood, i.e. cellulose, lignin, and hemicelluloses. This is confirmed by microscopic and infrared analysis. A small amount of blood is detected on the specimen.

●The shoulder location of the specimen is curious. It is certainly not a common place for a splinter to be found. If connected to an abduction, this along with a second fibrous material removed from the back in 2012 might suggest a clue to the environment or location surrounding the event.

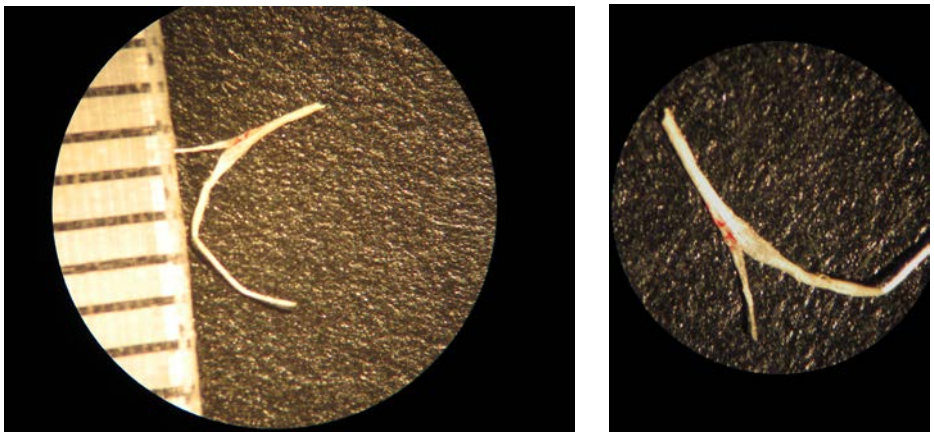
Procedure:

The sample was received on March 10, 2016, submitted in a small resealable plastic bag.

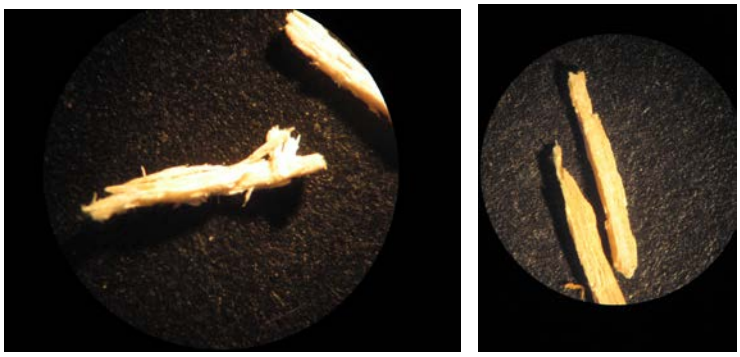
An infrared spectrum[1] was obtained from the specimen on the Thermo Electron Avatar 360 spectrometer using the Smart Herrick diamond sampling accessory. Photographs were also obtained from the Leica GZ6 stereomicroscope interfaced to a Canon A520 digital camera.

Results:

A microscope photograph of the specimen next to a ruler graduated in millimeters shows the specimen is about 7 mm in length. It is ca. 0.1 mm average thinness and 0.2 mm at it's widest. The second photograph which follows is a closer view which clearly shows blood on the sample. In addition, its fibrous nature is apparent. It is similar to slivers taken from a 2X6 pine board and a twig which follow.[2]



Photographs of the specimen



Reference photographs of splinters obtained from a 2X6 pine board (Left) and a twig (right)

[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.

[2] The reference slivers are deliberately larger for convenience of handling. It was something of an art to obtain the spectrum of the extremely thin specimen without losing it. It was barely visible.

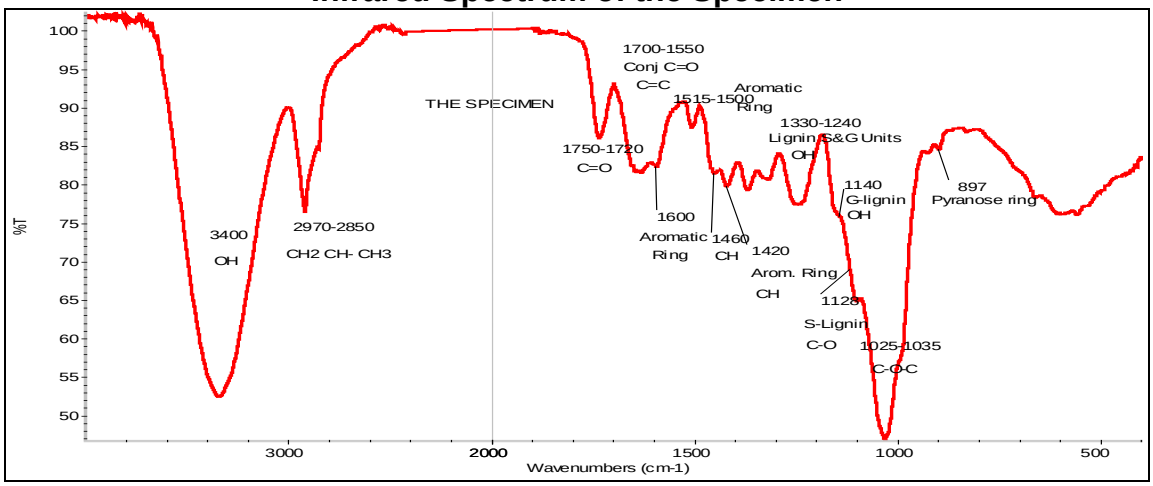
The infrared spectrum of the sample is typical of wood, which is made of cellulose, lignin, and hemicelluloses. Table I lists all the characteristic infrared frequencies for wood. These are all present in the spectrum of the specimen. Following is the Table as obtained from the literature, and the spectrum with peaks labeled.

Table 1. Main bands of infrared spectrum of wood and their assignment to functionality

Wavenumber (cm^{-1})	Functionality	Vibrating type
3400	O-H of alcohols, phenols and acids	O-H stretching [1,2]
2970-2850	CH_2, CH- and CH_3	C-H stretching [1,2]
1750-1720	C=O of esters, ketones, aldehydes and acids	C=O stretching, non-conjugated[1,2]
1700-1550	Conjugated C=O and C=C	Conjugated C = O stretching, and C=C stretching[1,2]
1600	Aromatic ring	Benzene ring stretching vibrations [1,2]
1515-1500	Aromatic ring	Benzene ring stretching vibrations [1,2]
1460	CH	C-H deformations [2]
1420	Aromatic ring and CH	Benzene skeletal combined with C-H deformations[1,2]
1240-1330	Lignin S and G units and OH	C-O stretching and bending OH[1,2] antisymmetric stretching vibration of the acetyl ester groups
1140	G- Guaiacyl lignin and C-O	C-H deformations in G lignin and C-O stretching[3]
1128	S- Syringyl lignin and C-O	C-H deformations in S lignin and C-O stretching[1,3]
1025-1035	C-O-C	Deformation [1,2]
897	anti-symmetric out-of-phase stretching in pyranose ring	stretching in pyranose ring [1,2]

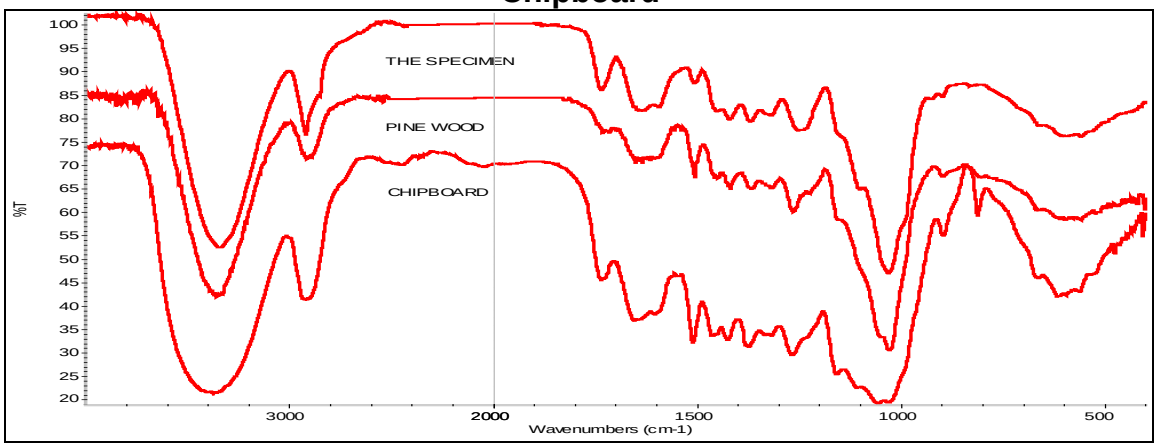
1Rodrigues et al. (1998), 2Mitchell and Higgins (2002),3Faix (1991)

Infrared Spectrum of the Specimen



Additionally, the specimen spectrum, along with references of wood and chipboard follow to display the close comparison.

Infrared Spectra of the Specimen and References of Pine Wood and Chipboard



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Phyllis A. Budinger