

Good example of fourier transform infrared (ftir) spectroscopy report

[Business](#), [Company](#)



Forensic investigations have gained widespread application by law enforcement agencies during the analysis of a crime (Tewari and Ravikumar 2000). Forensic experts have a tough task because they have to use samples collected from a crime scene to reveal the culprits. In this case, the investigator has to determine which of the two companies (A or B) is responsible for the pollution that was reported.

The samples that were collected have been analyzed using Fourier Transform Infrared (FTIR) spectroscopy. This form of spectroscopy is employed to produce an infrared spectrum of not only photoconductivity and emission, but also absorption of a substance that can be either in a solid, liquid or gaseous form (SEM LAB. 2013). This technique is useful because it produces various images in a wide spectral range. As such, it is more advantageous than other forms of spectroscopy that collect data from limited wavelengths.

During the use of this technique, a beam containing different frequencies of light is shone on a sample (Torkelson, Lipsky, Tirrell, M., and Tirrell, A. 1983). The amount of the beam that is absorbed by the sample is then computed using Fourier transform.

When analyzing computational outputs, it is important to note that the y-axis represents absorbance on the scale of 0-1 (SEM LAB. 2013). When the y-axis value is 0, there is absorption, but if it is 1, then that is the maximum absorption (SEM LAB. 2013). On the other hand, the x-axis represents wavenumber (cm^{-1}) (the inverse of wavelength) (SEM LAB. 2013). The points where the curves have sharp points shows the highest absorbance of a given material; materials that have similar bonds will show similar absorbance

curves.

In this case, a reference graph (QC) has been provided; this means that the suspect samples that have similar absorbance wavelengths as the QC graph are more likely to be the ones at the crime scene.

The QC sample (polystyrene) has absorbance at two points: 1451. 74 and 747. 91.

The sample of the flake derived from the creek has absorbance at various points, but three of them are close to those of the QC: 1402. 54, 1452. 03 and 748. 31.

Flake sample from the company A has different absorbance, but those that are close to the QC sample are 1452. 90, 1492. 76 and 755. 38.

There is no sample flake sample from company B.

The flake sample derived from company A has an absorbance at 1452. 90, which is almost similar to the absorbance of the QC sample (1452. 74) and 1402. 54 (Creek Flake sample);

Comparisons show close similarity between flake samples derived from company A, creek sample and QC sample.

With respect to samples in powder form, here are the results.

The QC sample (polystyrene) has absorbance at two points: 1451. 74 and 747. 91.

The creek sample white powder has absorbance at: 3287. 02, 2928. 20, 1635. 15, 13337. 05, 1149. 21, 1036. 74, 1000, 926. 91, and 760. 40.

The creek sample white powder from the company A has absorbance at: 2163. 00, 1979. 85, 1623. 39 and 1105. 74 and 650. 0.

Company B white powder sample has absorbance at: 3277. 33, 2928. 68, 1615. 12, 1338. 98, 1148. 07, 926. 98, 859. 33, and 762. 85.

Company B's white sample powder has absorbance that is similar to that of the powder sample derived from the creek.

Conclusion

Flake Samples from the creek and the two suspect companies A and B, were compared. When compared to the QC sample, those comparison shows that the sample derived from the creek has absorbance similar to those from company A.

Primary suspect for sample flake deposition at the creek is Company A.

Company B's white sample powder has absorbance that is similar to that of the powder sample derived from the creek.

Primary suspect for powder deposition at the creek is company B.

Primary conclusion: both companies are culprits.

References

Torkelson, J, Lipsky , S, Tirrell , M, and Tirrell, A, 1983, Fluorescence and absorbance of polystyrene in dilute and semidilute solutions, *Macromolecules*, vol. 16 no. 2, pp. 326–330.

SEM LAB. 2013, Fourier Transform Infrared (FTIR) Spectroscopy, accessed April 18, 2014 from <http://www.semlab.com/FTIRAnalysis.pdf>.

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