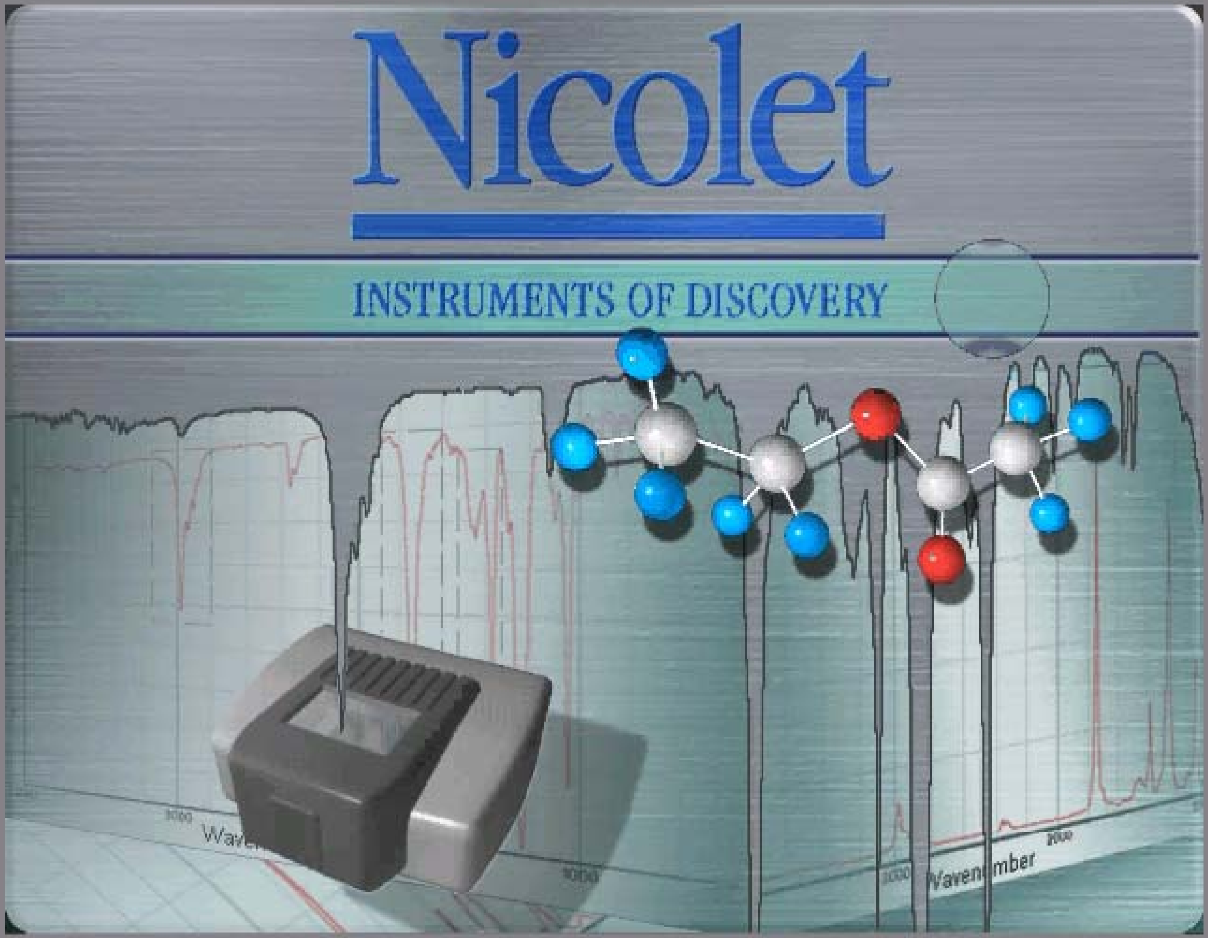
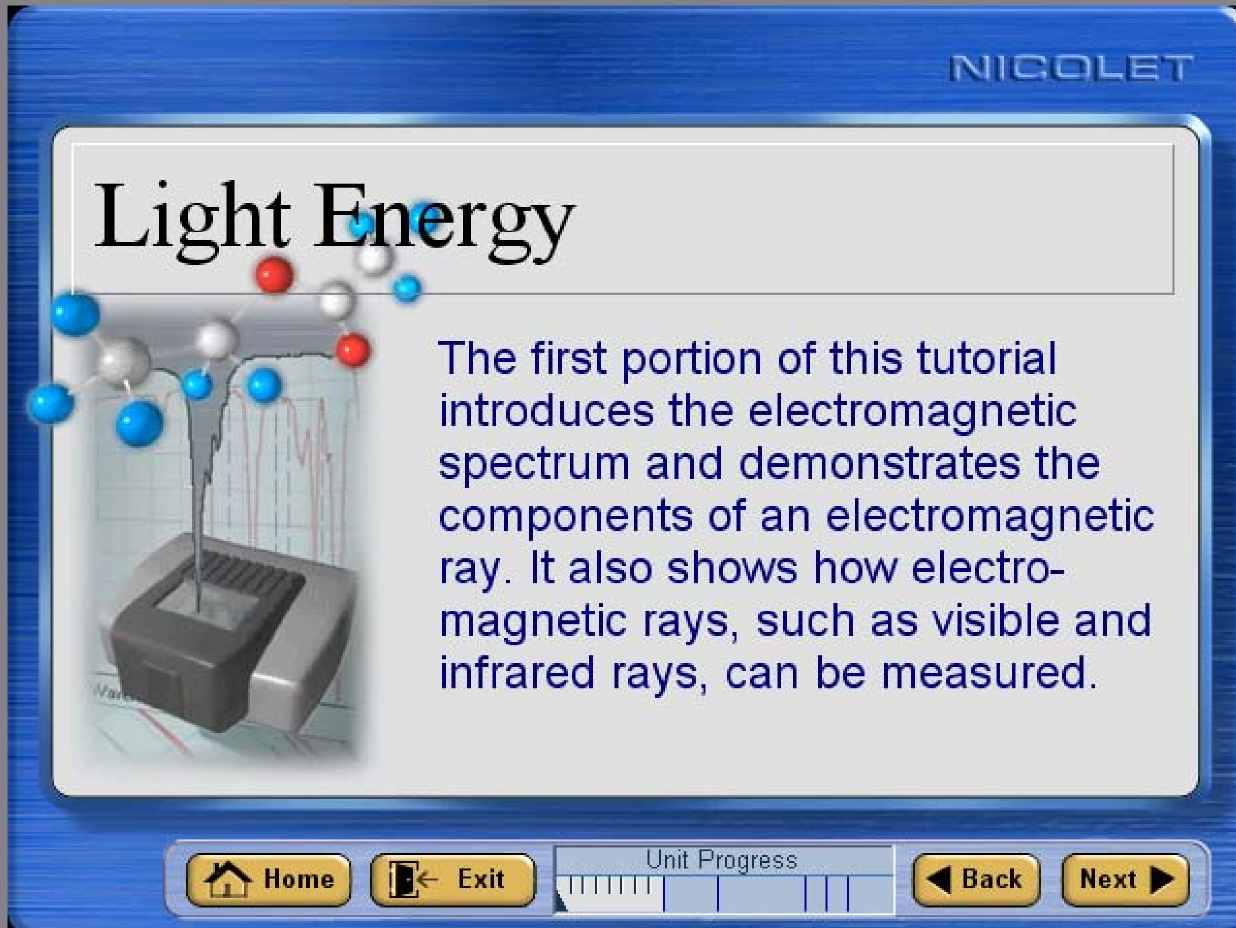
FTIR as an analyze technique in Composite materials

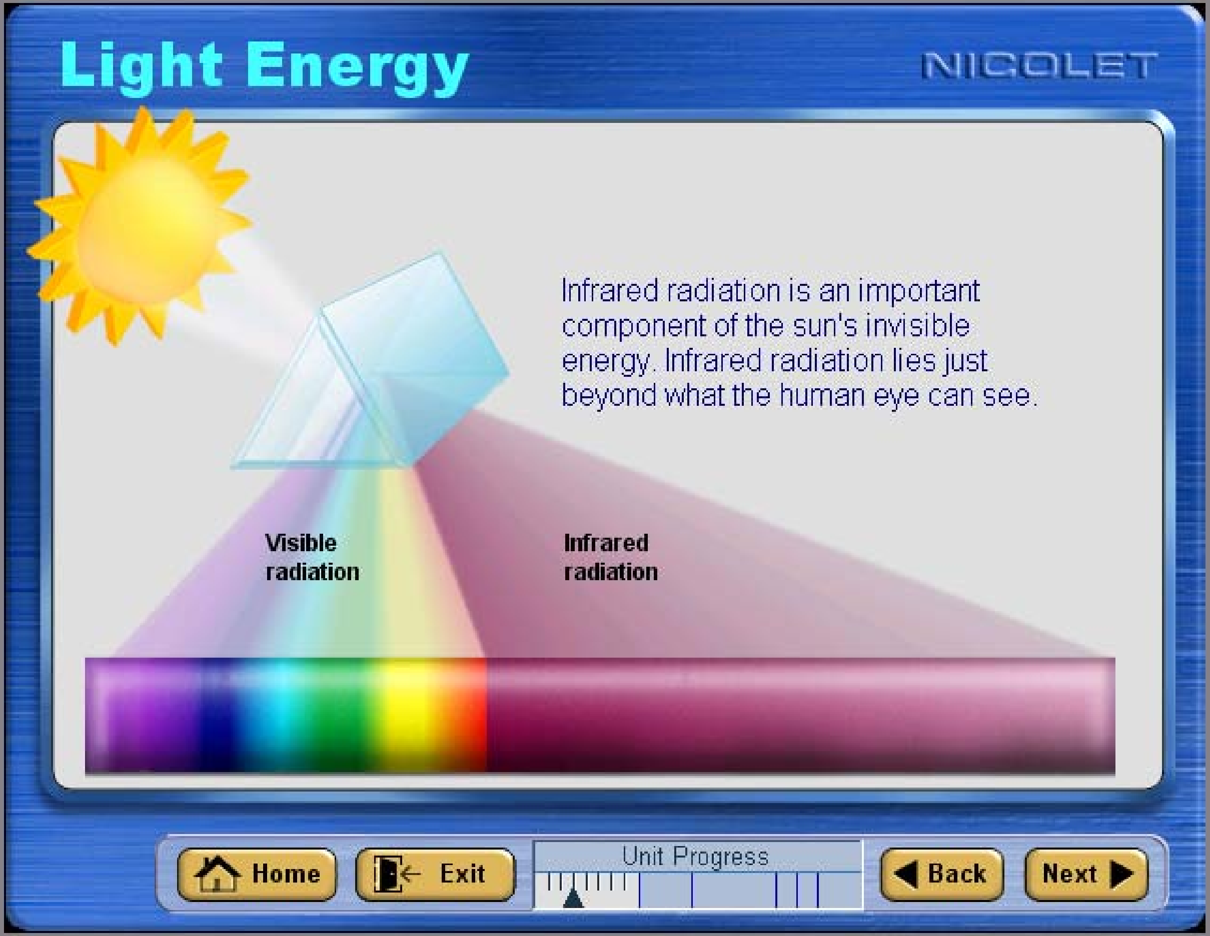
FTIR as an analyze technique in Composite materials



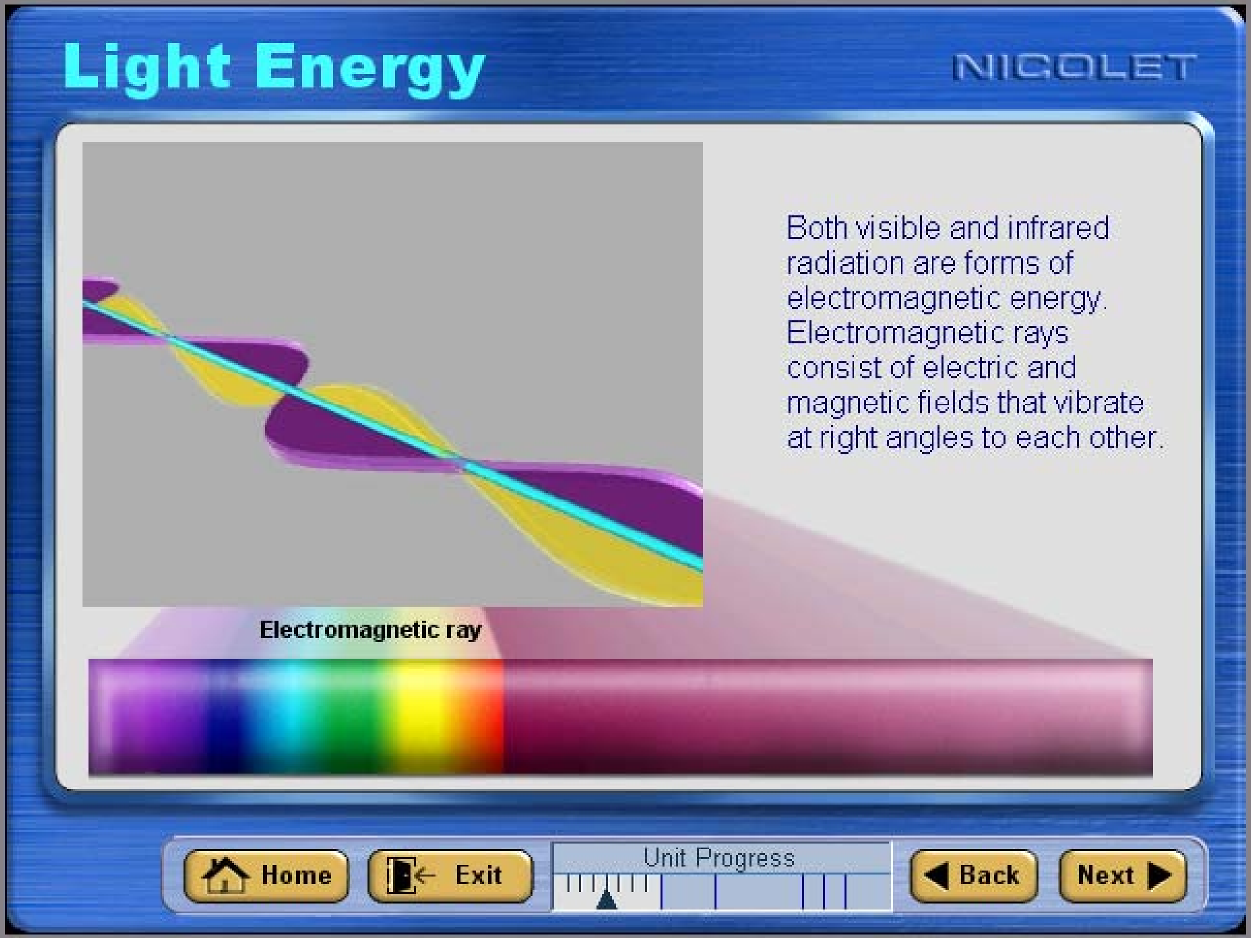
FTIR as an analyze technique in Composite materials



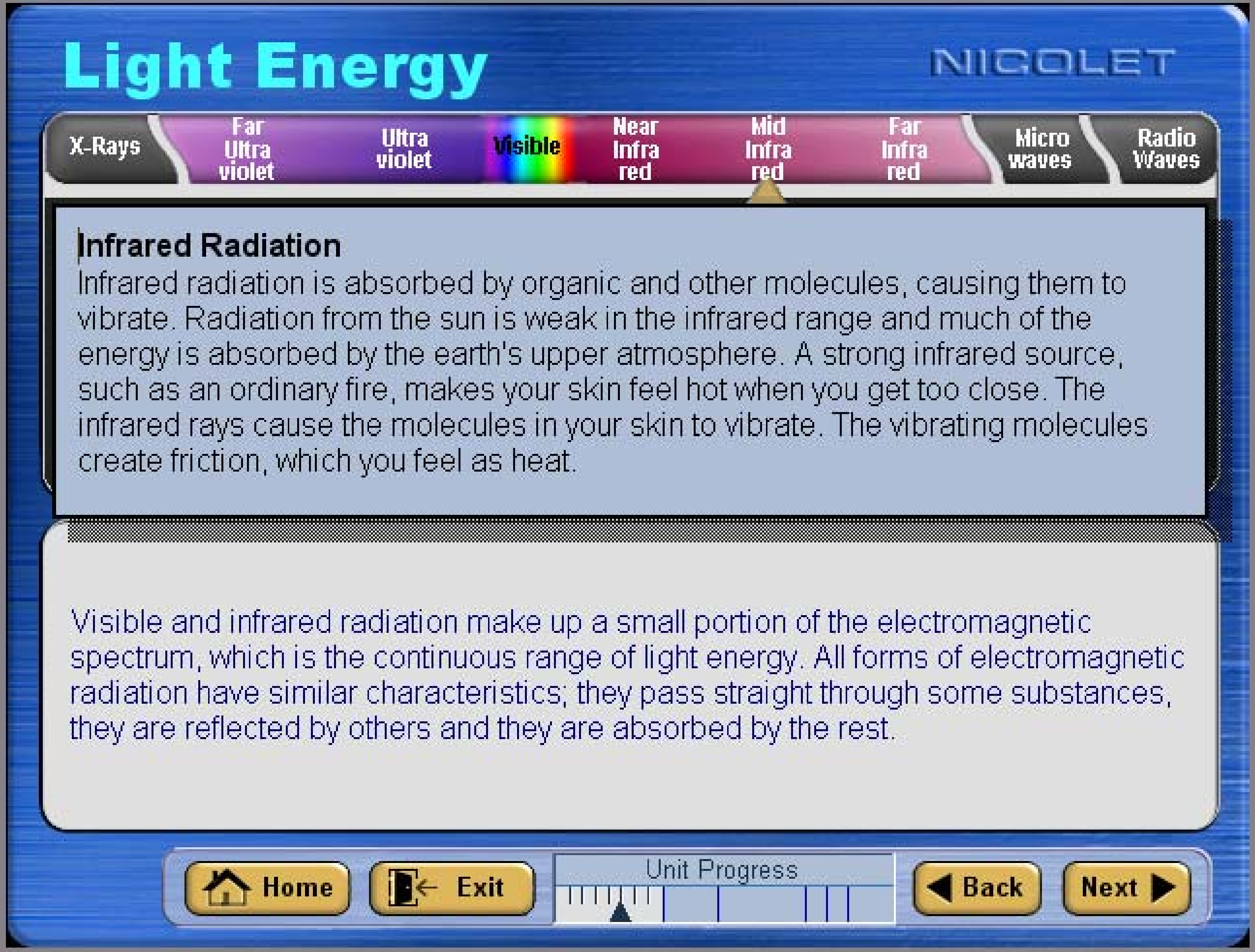
FTIR as an analyze technique in Composite materials



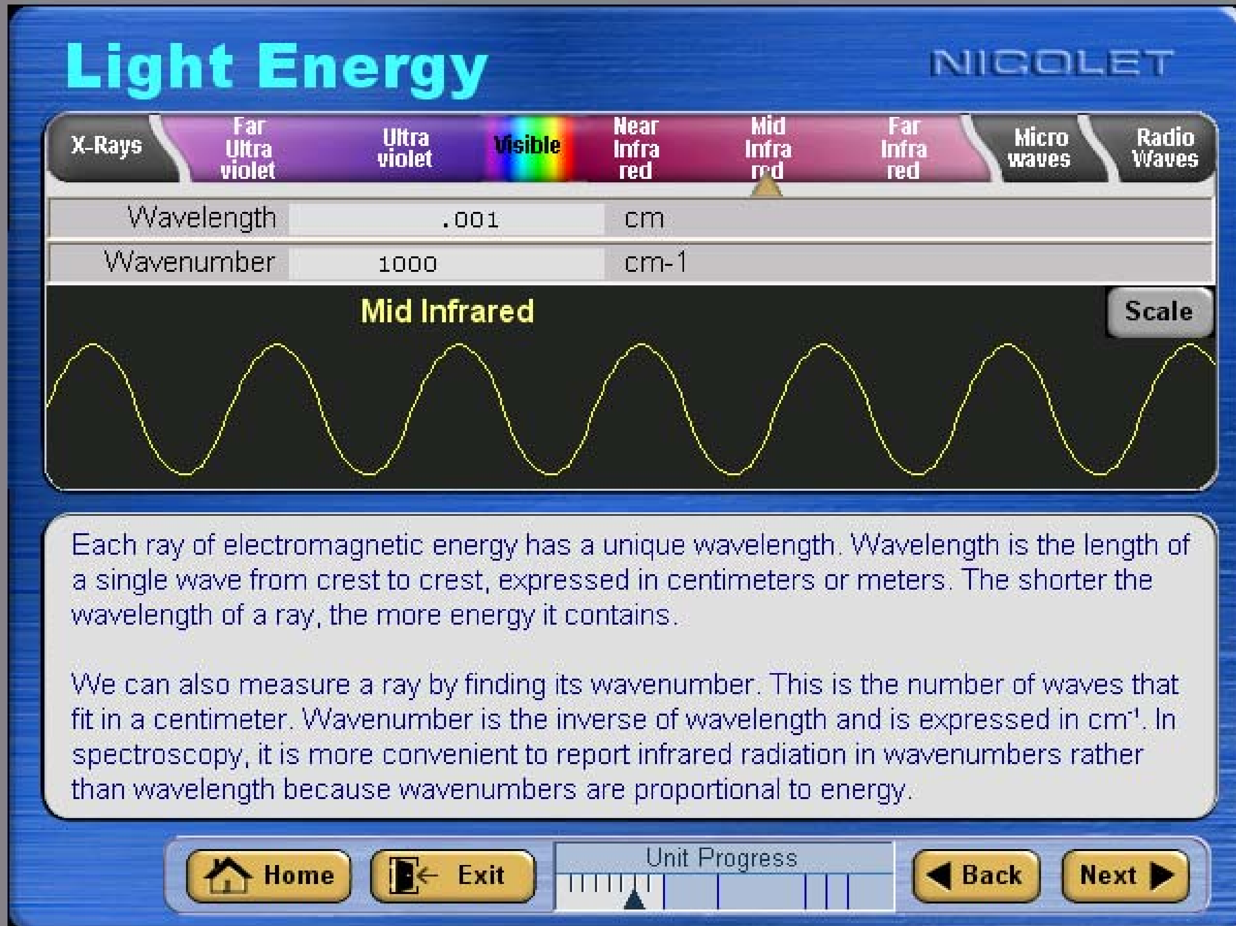
FTIR as an analyze technique in Composite materials



FTIR as an analyze technique in Composite materials



FTIR as an analyze technique in Composite materials



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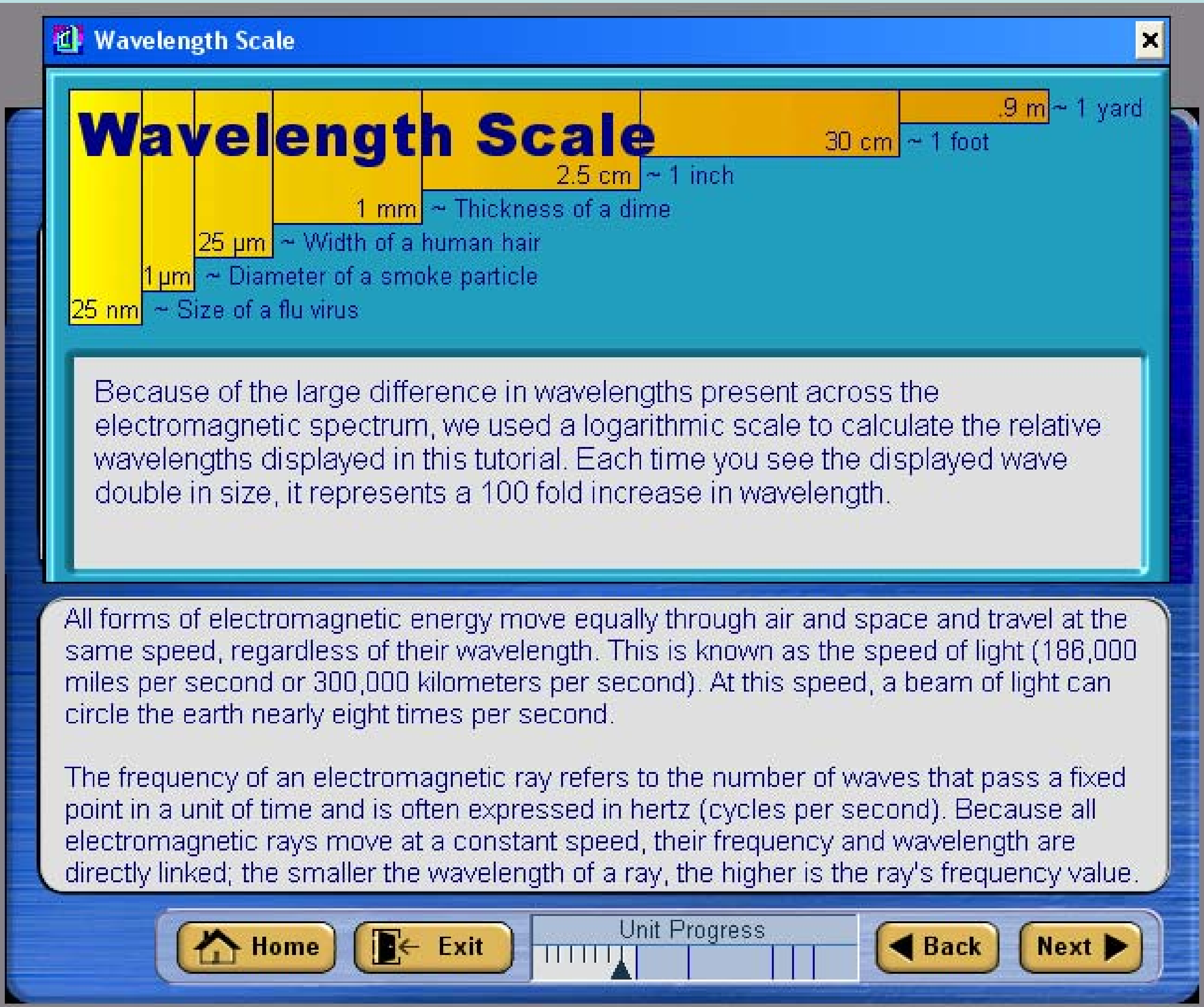
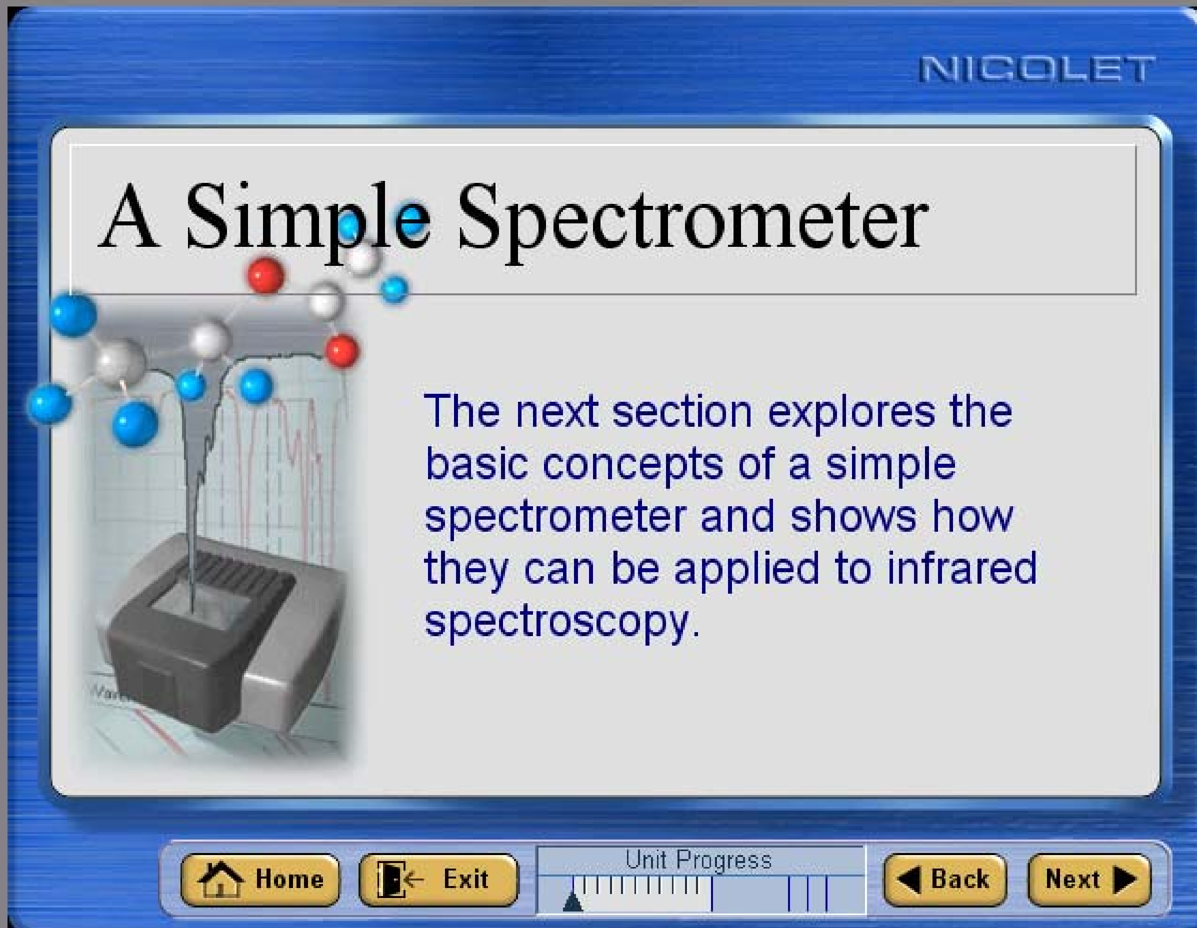
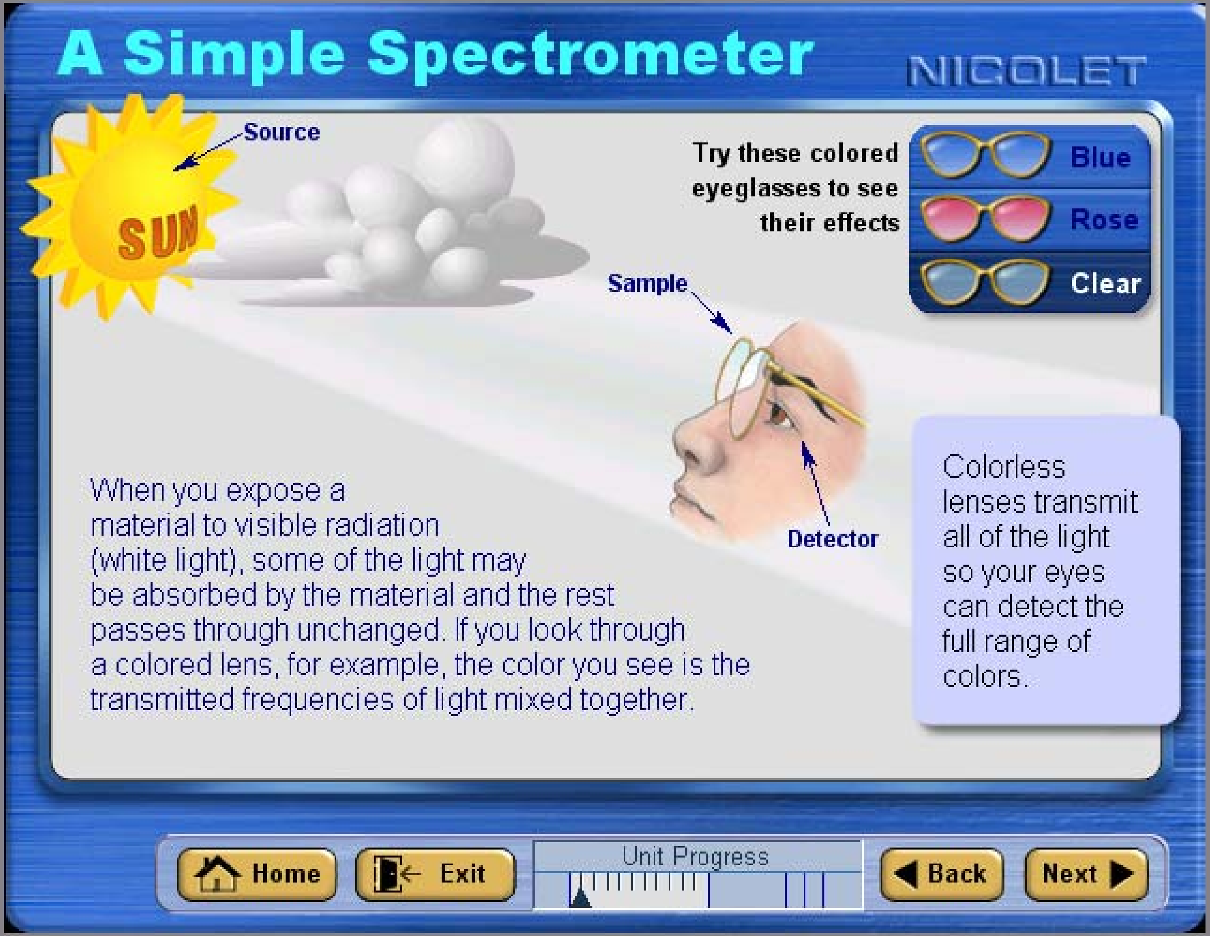


FTIR as an analyze technique in Composite materials




A Simple Spectrometer
NICOLET
Source
SUN
Try these colored eyeglasses to see their effects
Blue
Rose
Clear
Sample
Detector
When you expose a material to visible radiation (white light), some of the light may be absorbed by the material and the rest passes through unchanged. If you look through a colored lens, for example, the color you see is the transmitted frequencies of light mixed together.
Colorless lenses transmit all of the light so your eyes can detect the full range of colors.
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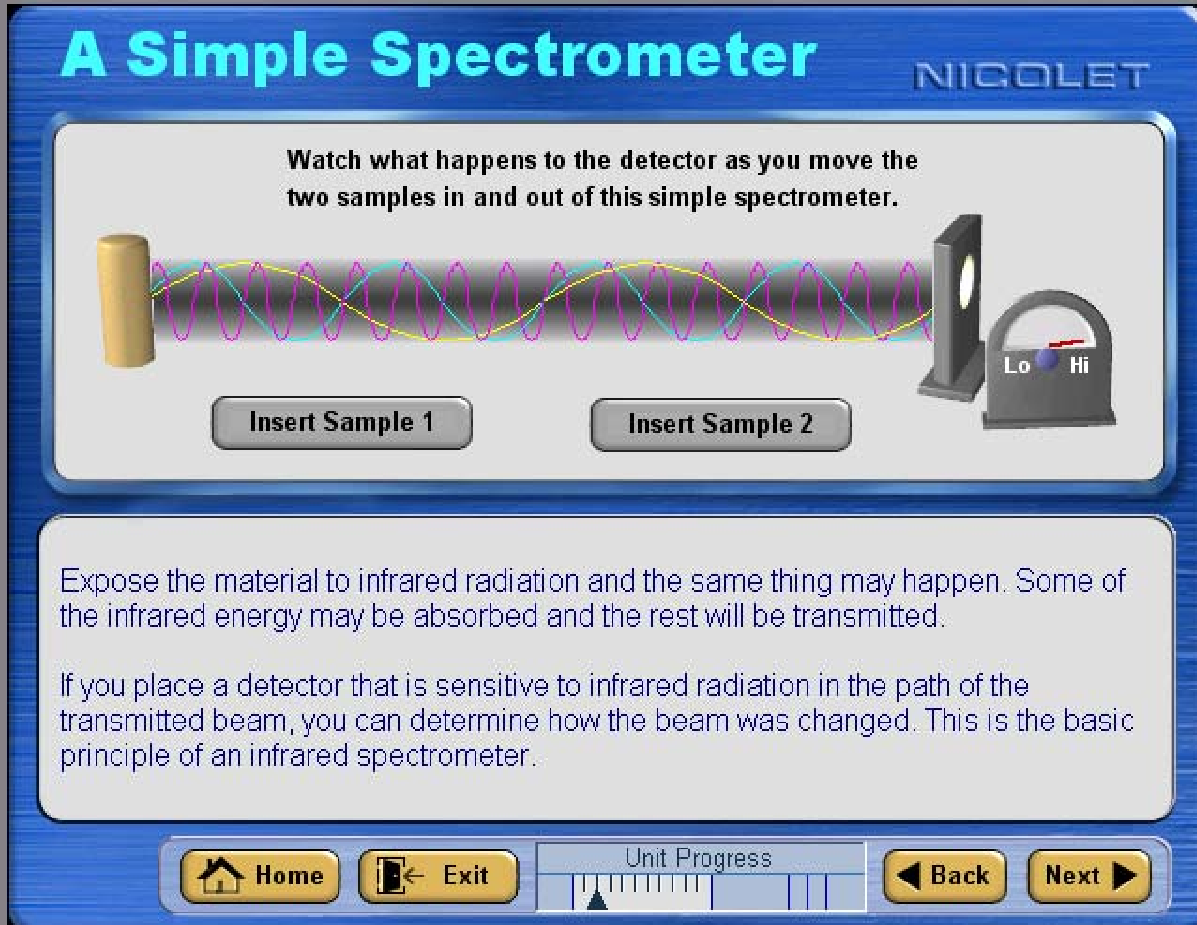
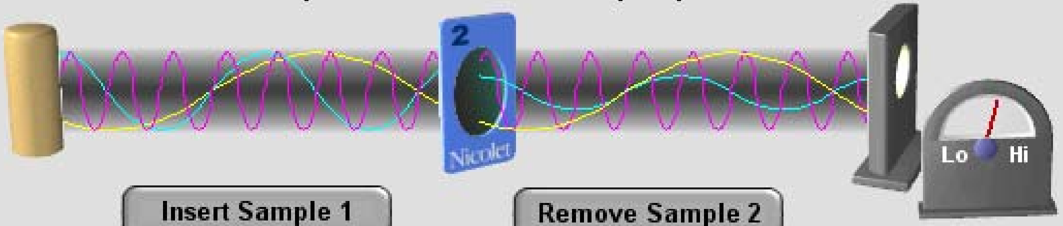
FTIR as an analyze technique in Composite materials



A Simple Spectrometer

NICOLET

Watch what happens to the detector as you move the two samples in and out of this simple spectrometer.



Insert Sample 1

Remove Sample 2

Expose the material to infrared radiation and the same thing may happen. Some of the infrared energy may be absorbed and the rest will be transmitted.

If you place a detector that is sensitive to infrared radiation in the path of the transmitted beam, you can determine how the beam was changed. This is the basic principle of an infrared spectrometer.

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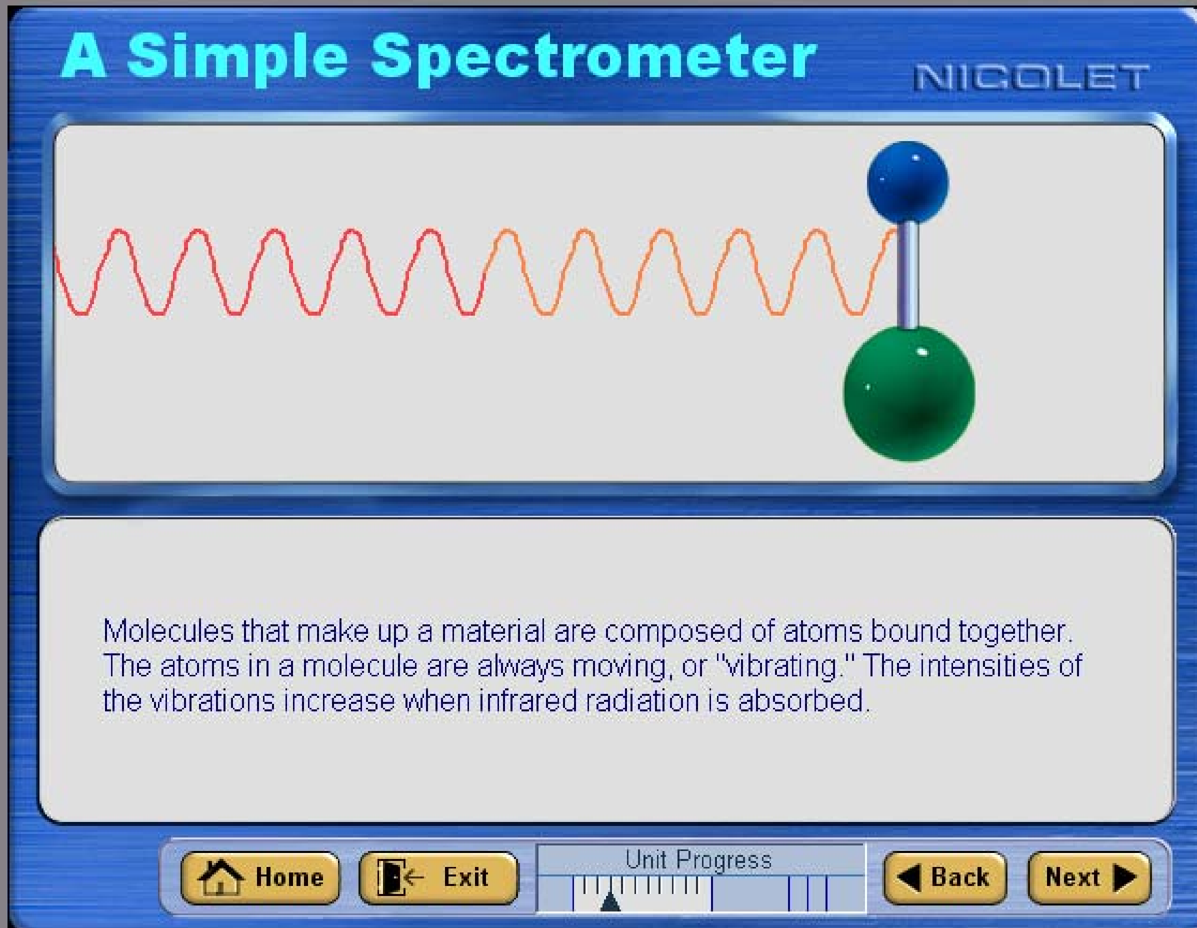
A Simple Spectrometer
NICOLET
Molecules that make up a material are composed of atoms bound together. The atoms in a molecule are always moving, or "vibrating." The intensities of the vibrations increase when infrared radiation is absorbed.
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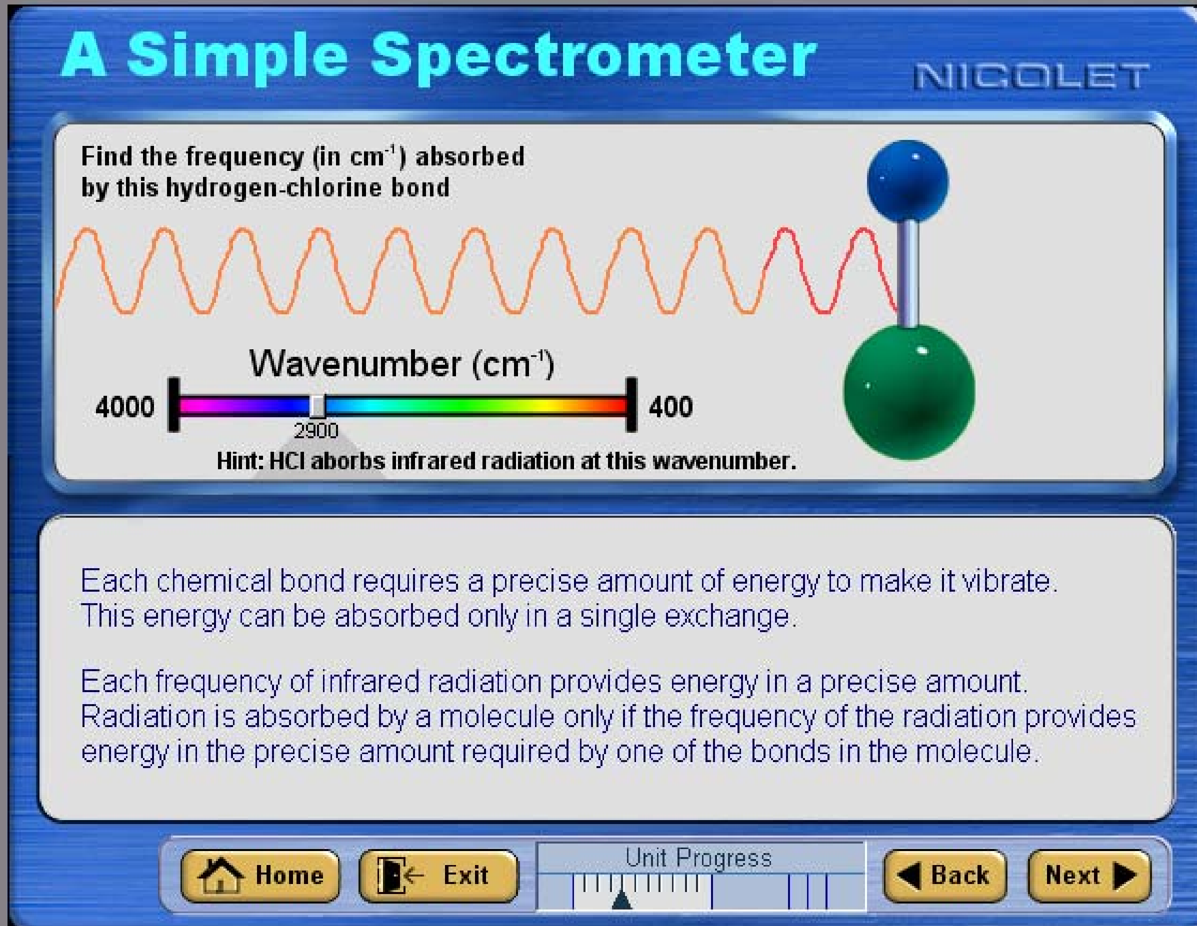
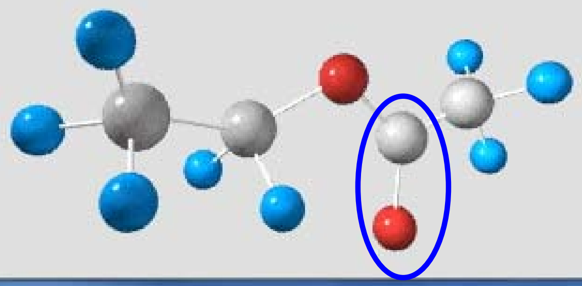


FTIR as an analyze technique in Composite materials

A Simple Spectrometer

NICOLET

Ethyl acetate molecule



Depending on the number of ways it can move (bend, stretch, etc.), each kind of bond may absorb infrared radiation at one or more specific frequencies. The double bond between carbon and oxygen (C=O), for example, absorbs energy near 1750 wavenumbers, causing a characteristic stretching vibration.

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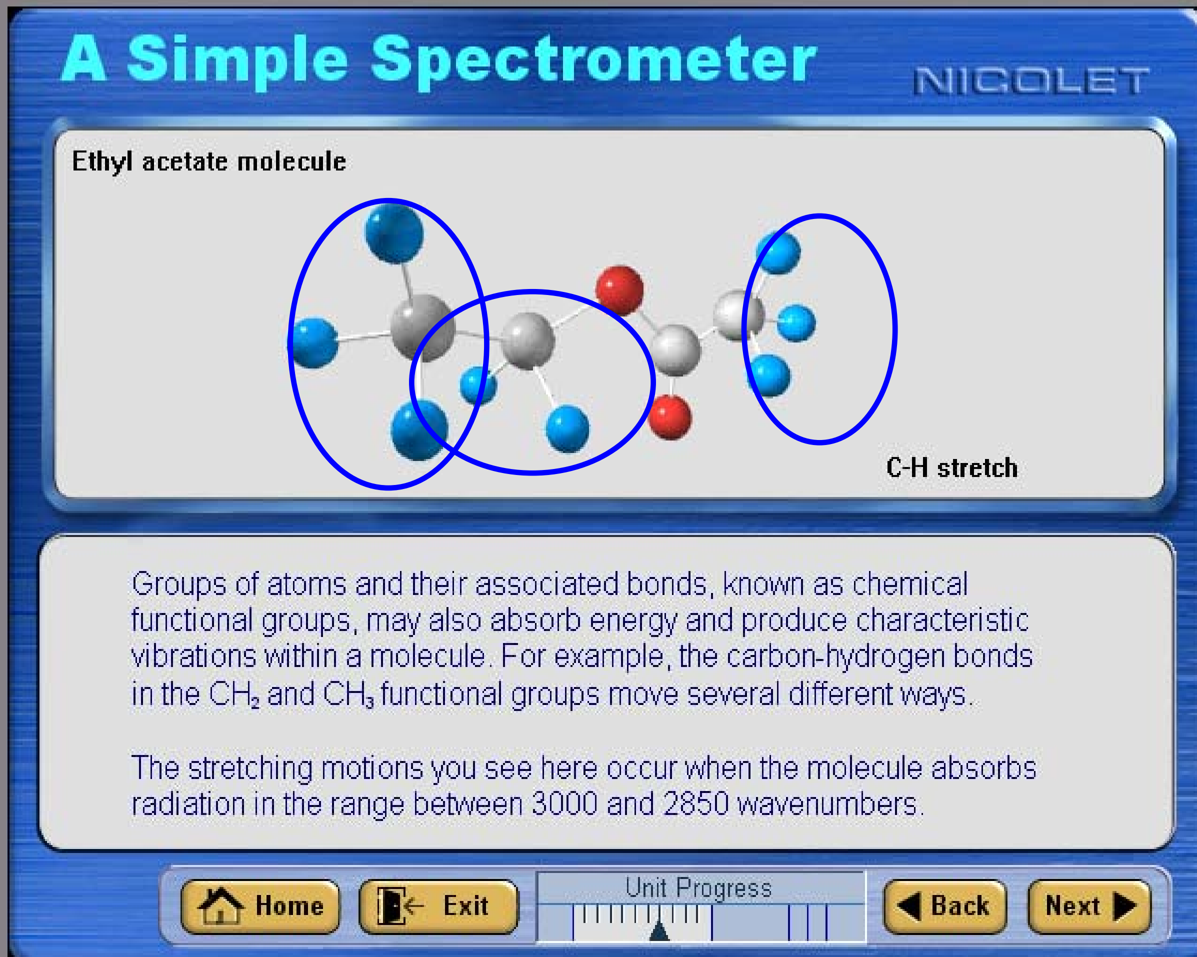

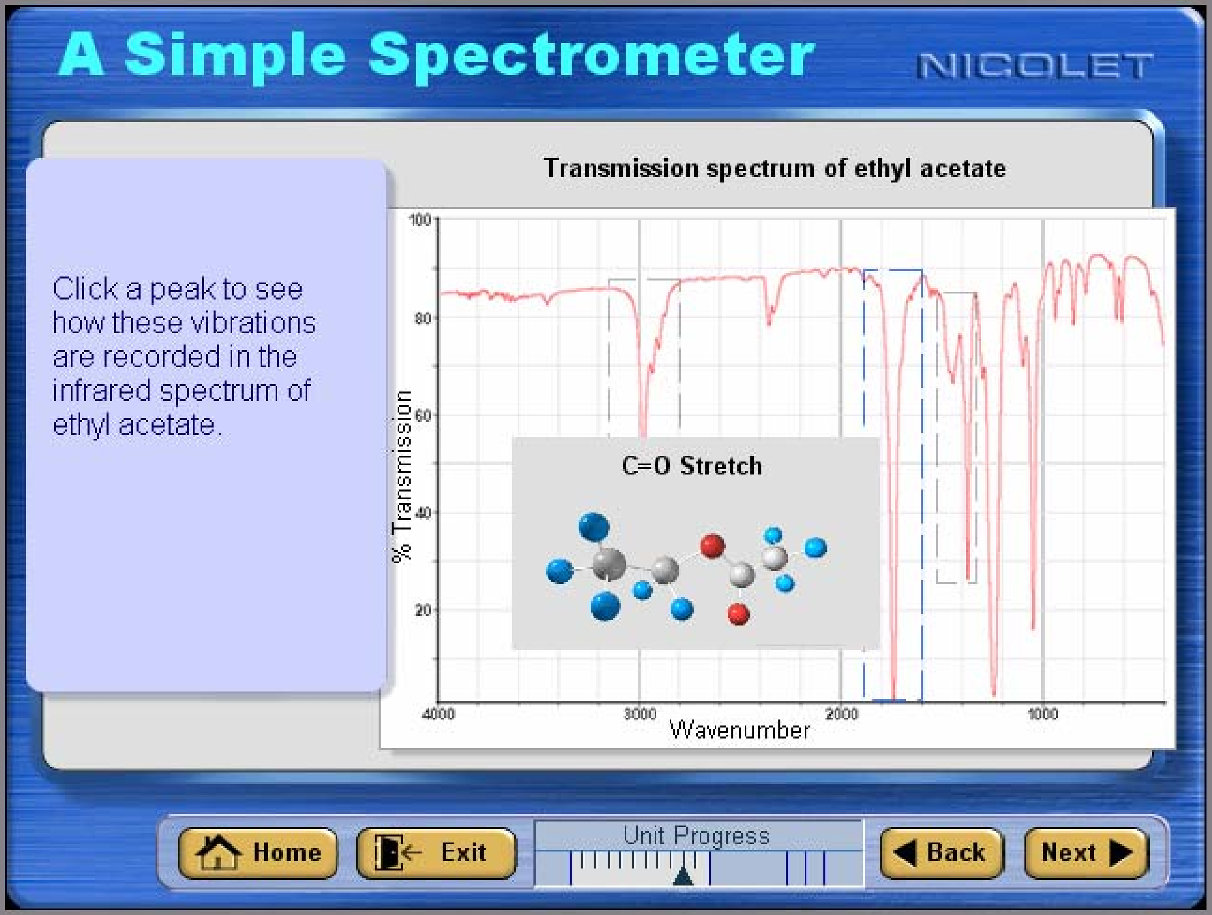
A Simple Spectrometer
NICOLET
Click a peak to see how these vibrations are recorded in the infrared spectrum of ethyl acetate.
Transmission spectrum of ethyl acetate
% Transmission
100
80
60
40
20
4000
3000
2000
1000
Wavenumber
C=O Stretch
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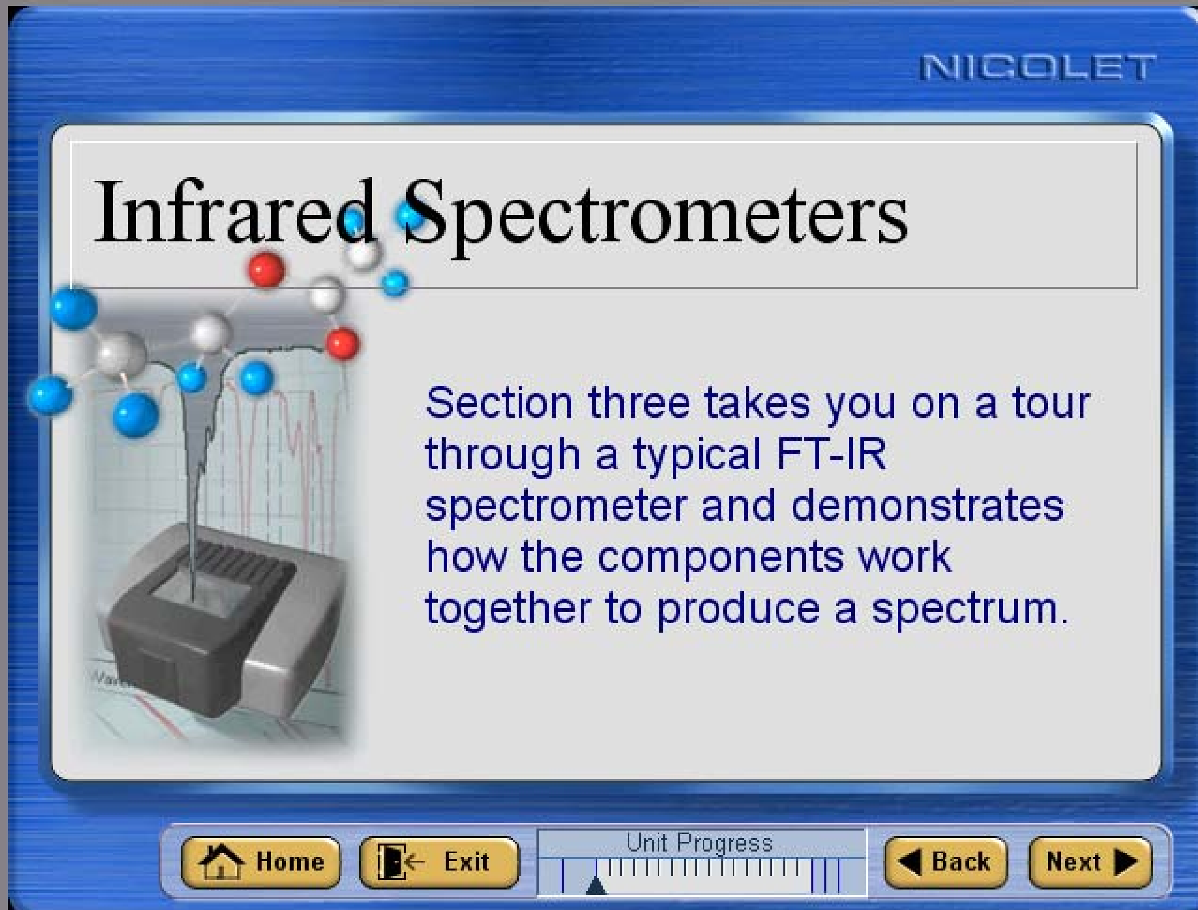
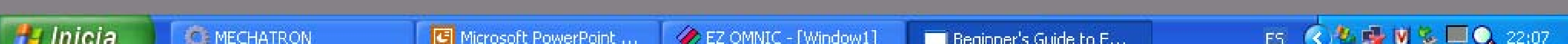
Inicia
MECHATRON
Microsoft PowerPoint ...
EZ OMNIC - [Window1]
Beginner's Guide to F...
ES
22:05

FTIR as an analyze technique in Composite materials





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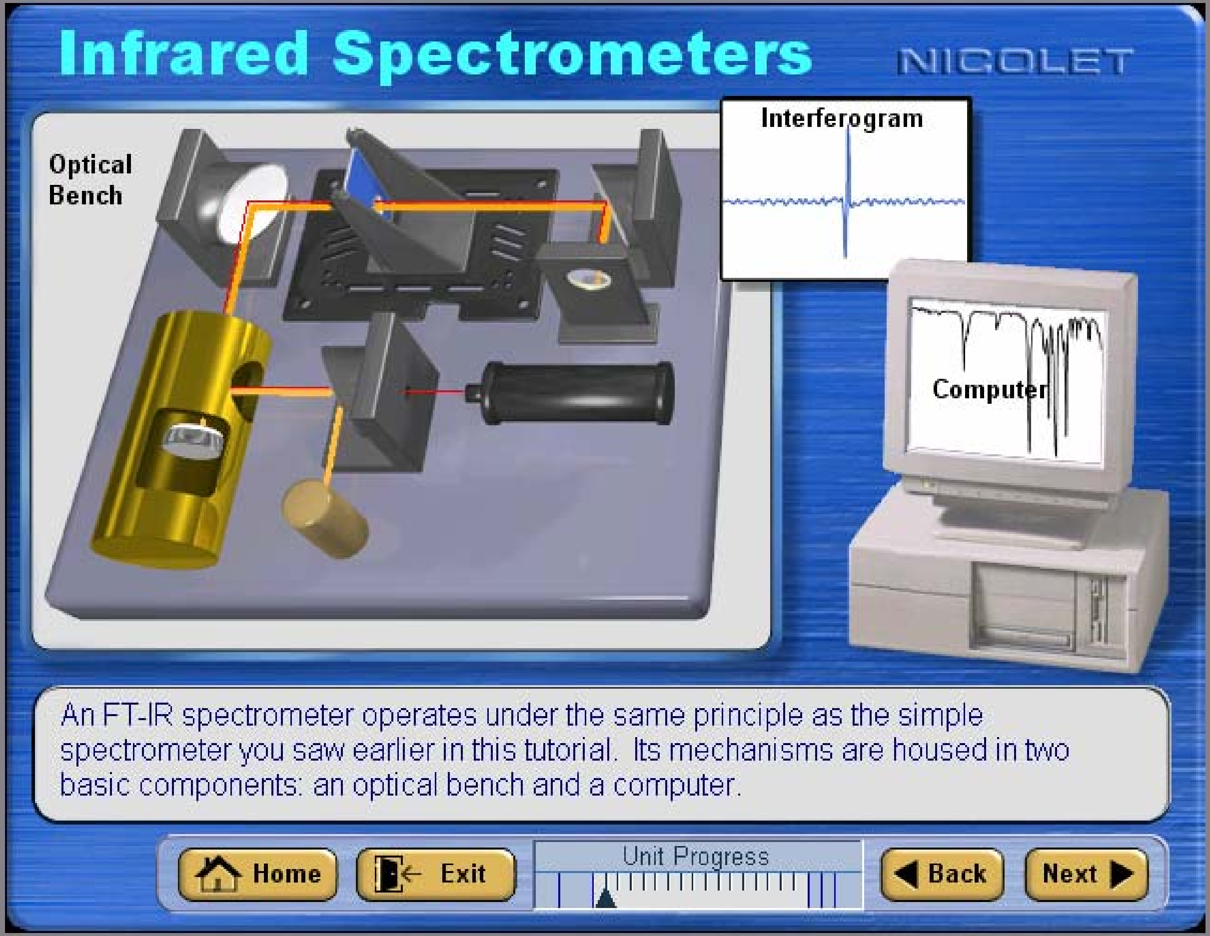

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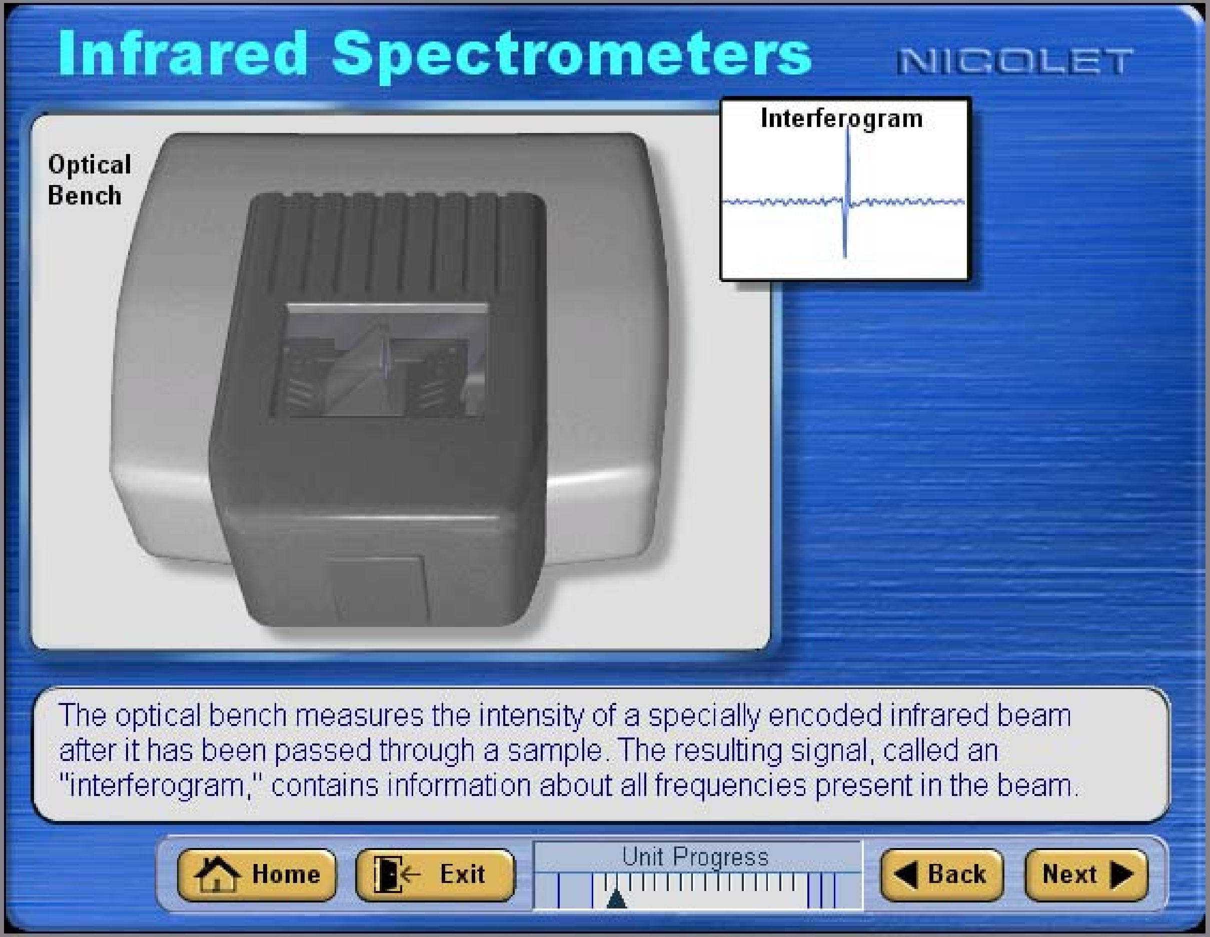

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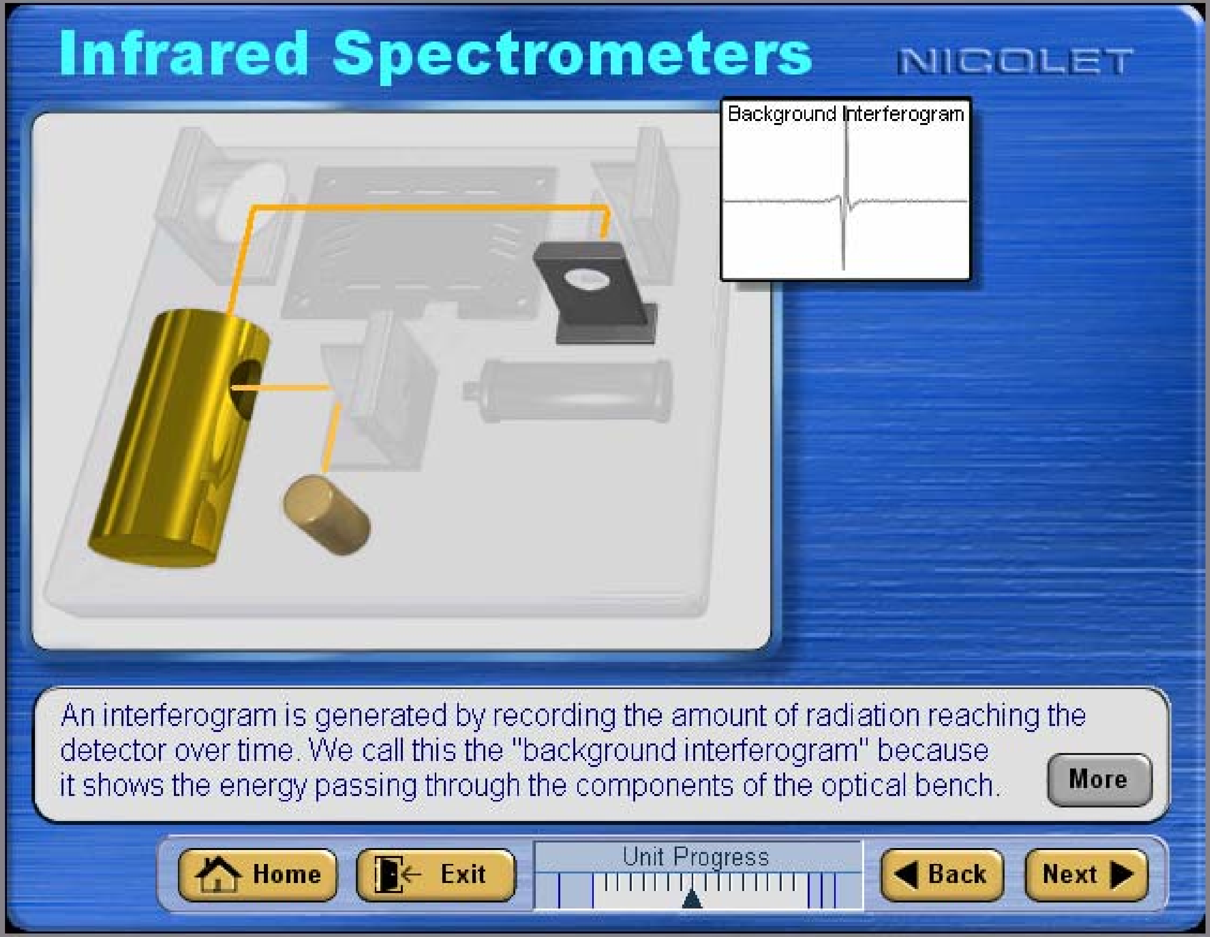

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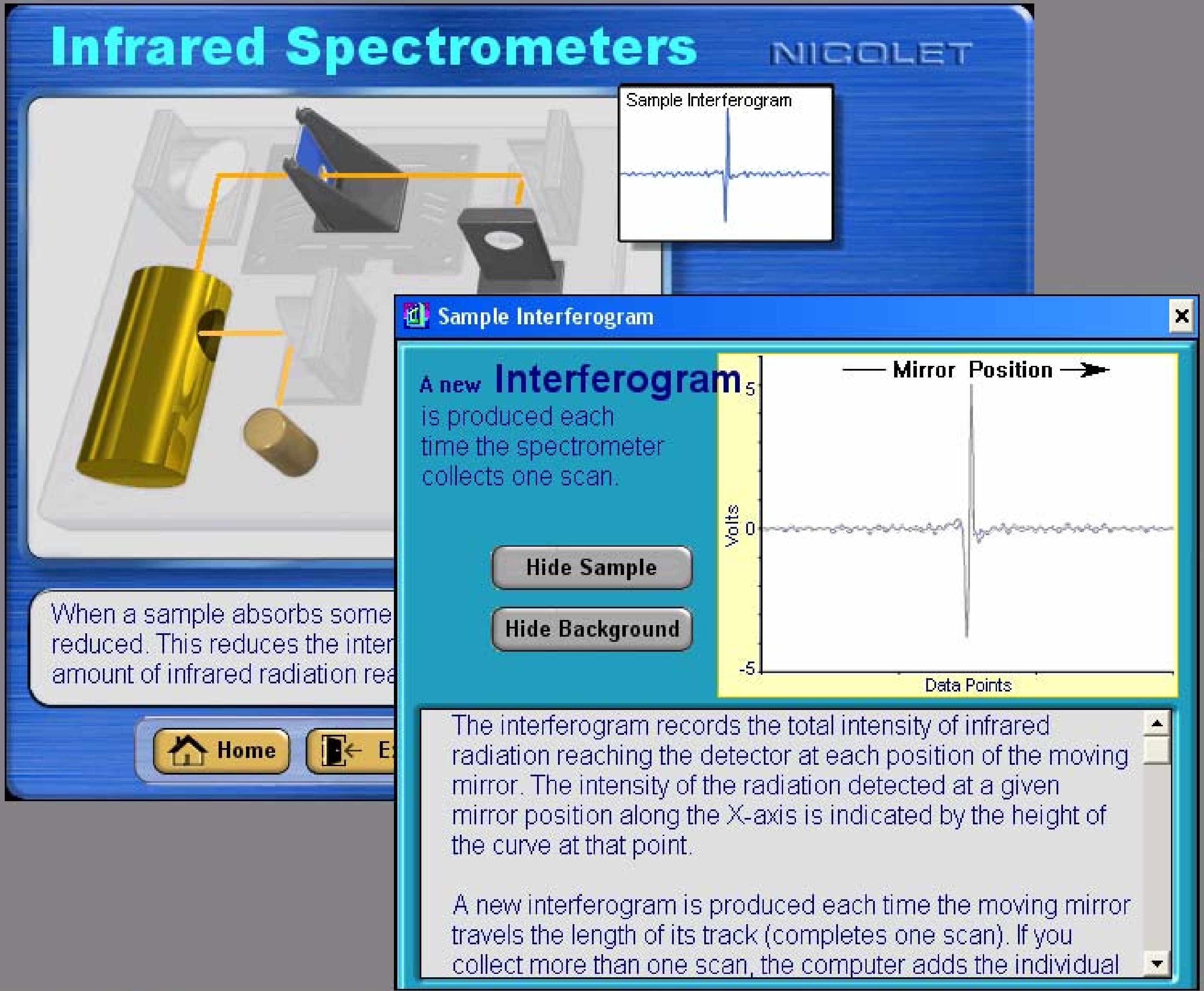

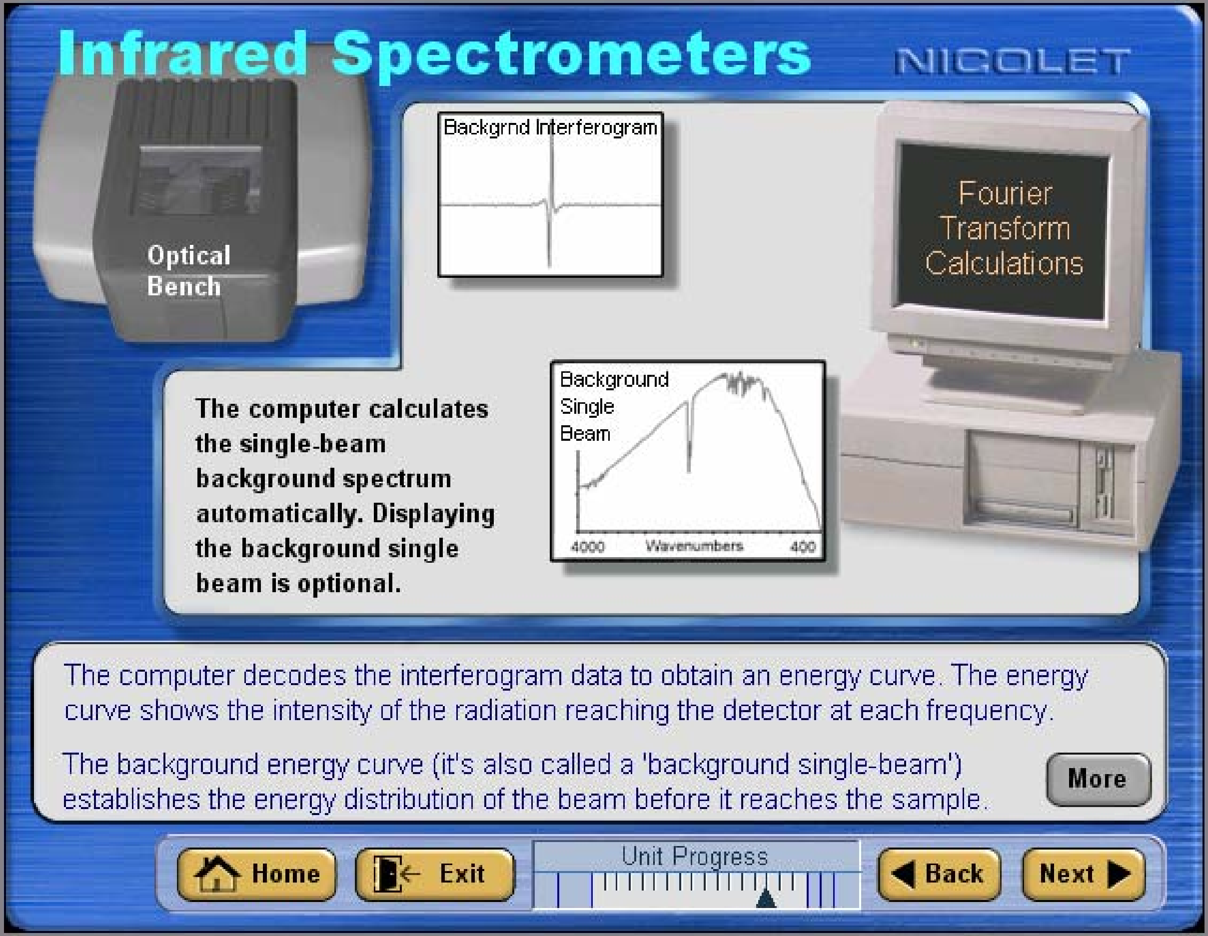
Infrared Spectrometers
NICOLET
Optical Bench
Backgrnd Interferogram
Fourier Transform Calculations
The computer calculates the single-beam background spectrum automatically. Displaying the background single beam is optional.
Background Single Beam
4000
Wavenumbers
400
The computer decodes the interferogram data to obtain an energy curve. The energy curve shows the intensity of the radiation reaching the detector at each frequency.
The background energy curve (it's also called a 'background single-beam') establishes the energy distribution of the beam before it reaches the sample.
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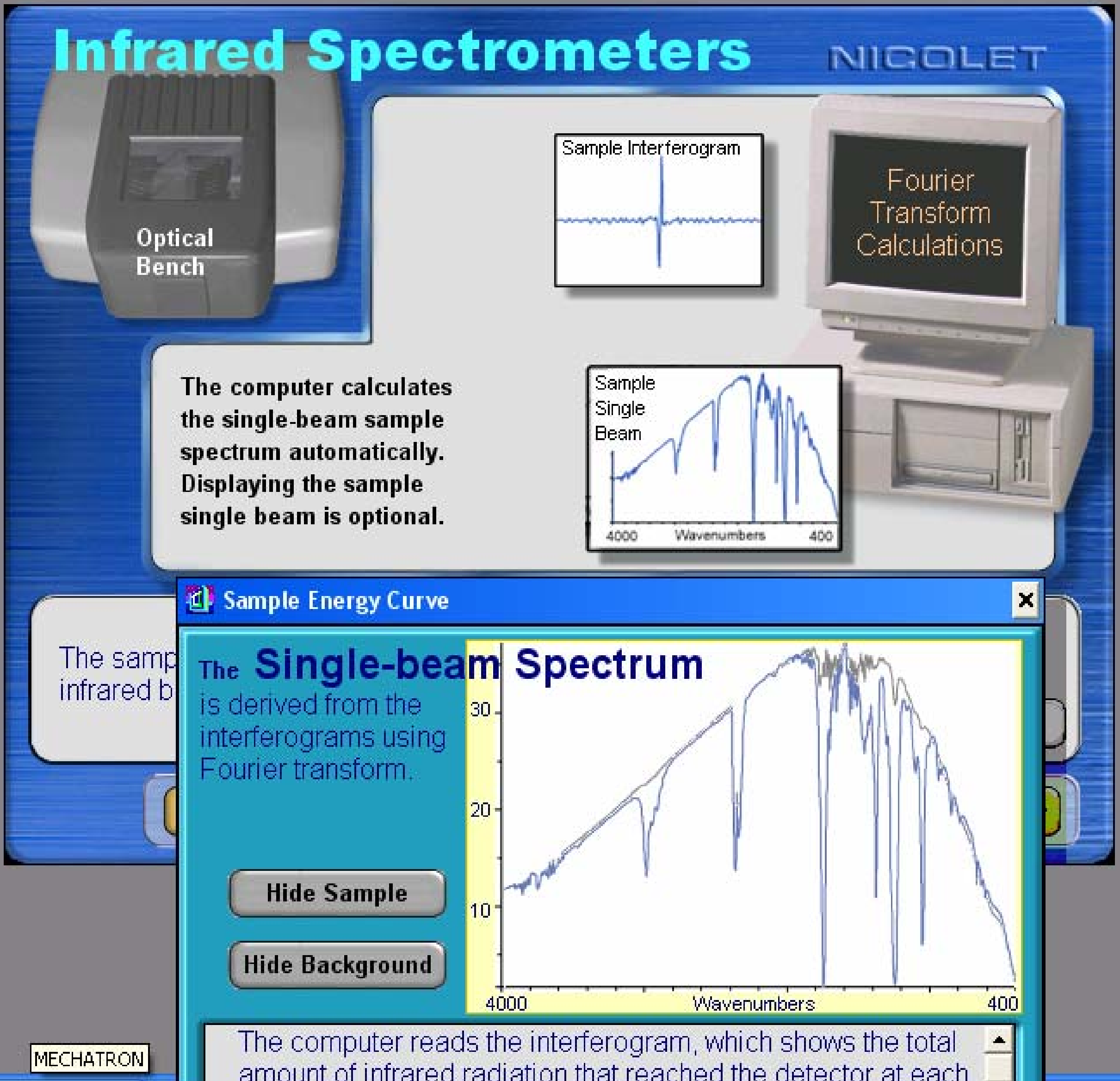
FTIR as an analyze technique in Composite materials



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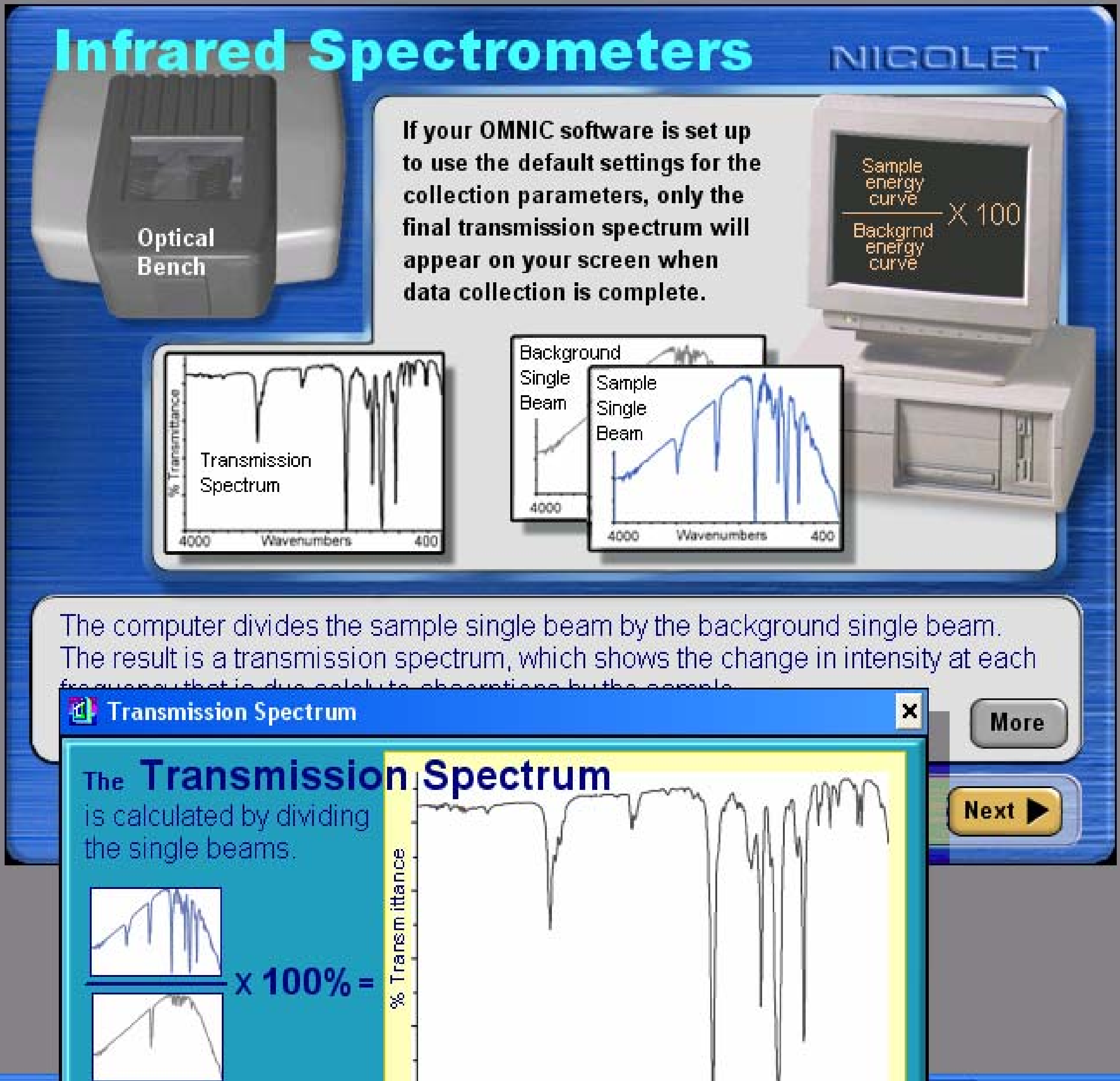
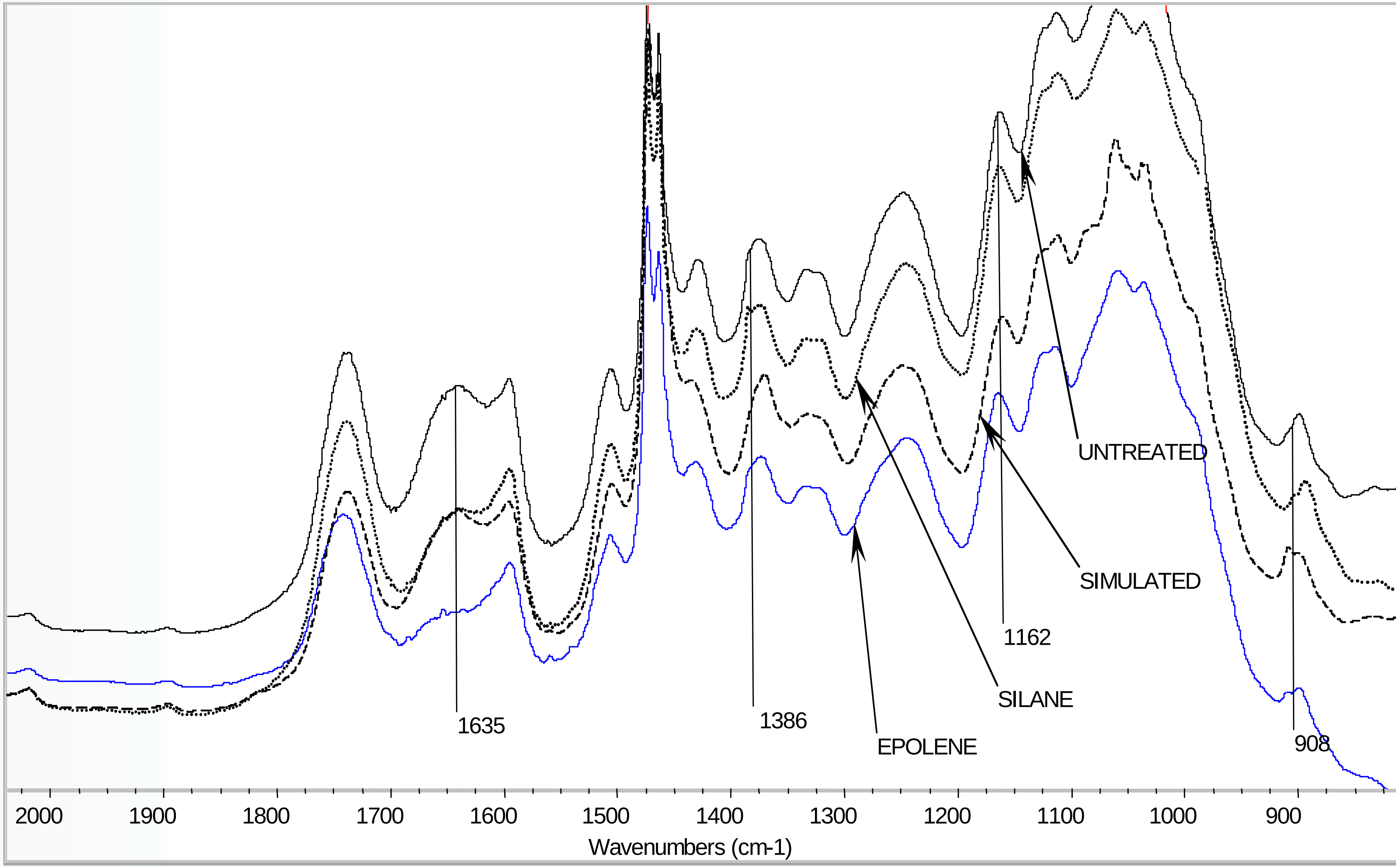


HDPE/wood spectra



NBR/glass fiber composite

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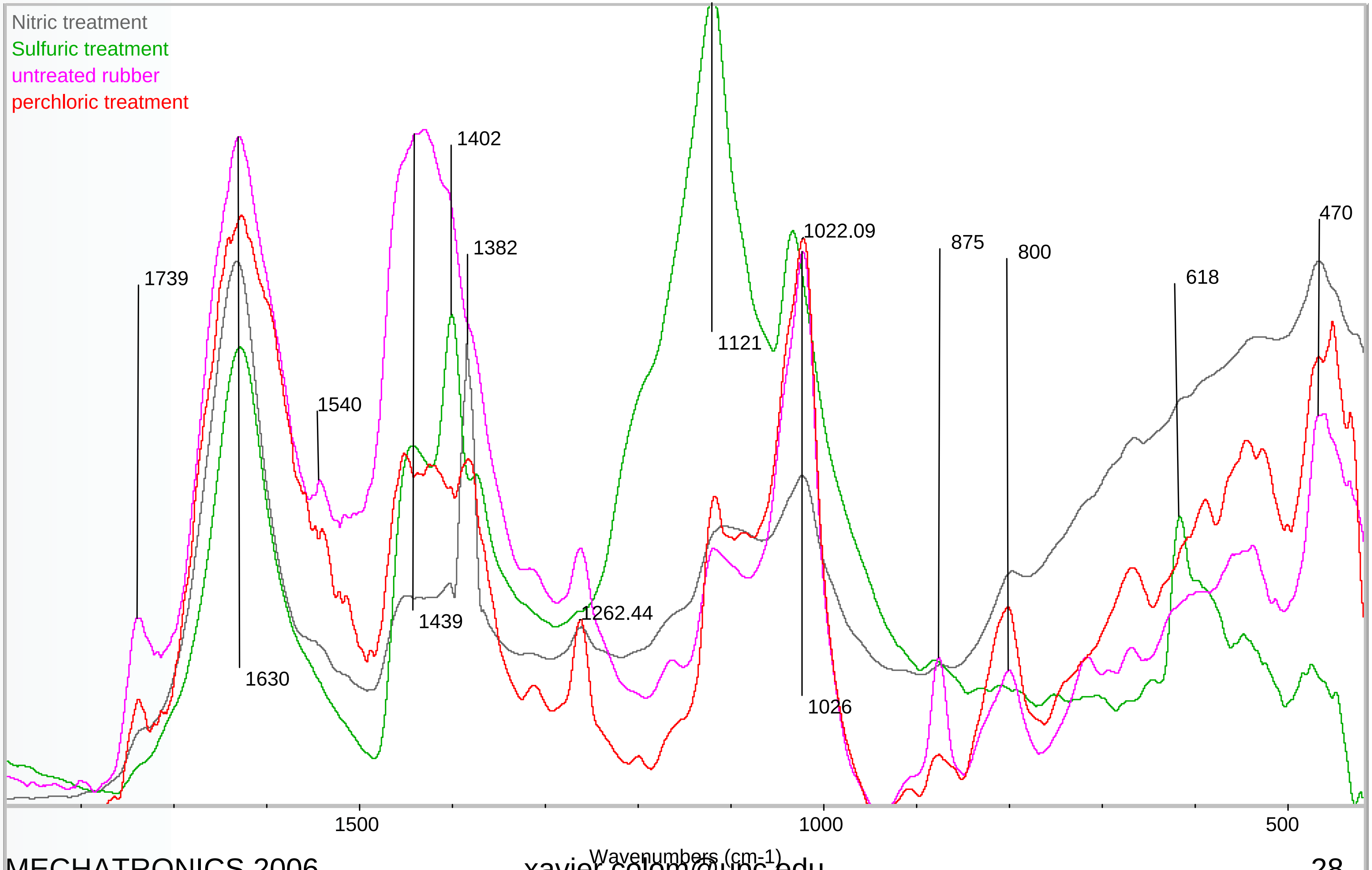
HDPE/tyre composite



Epoxy/CF composite

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