

Near-Infrared Transflectance Liquid Cell

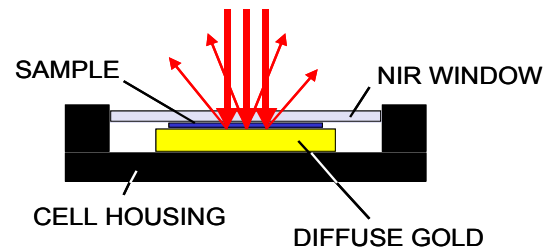
Transflectance Cell

Liquid samples are usually challenging in the infrared wavelength region due to the requirement that the liquid forms a repeatable thin layer. Another consideration for liquid cells is that some liquid samples contain suspended particulate matter which is difficult to pump through a conventional flow-through cell. Cleaning the cell from sample to sample also presents a problem if the cell is permanently closed such as the flow through cells. The Transflectance Cell is a demountable device comprising a bottom and a top part which come apart very easily. The top is held reproducibly in position at four points after assembly.

Samples can be applied as a single drop, with an eye-dropper or spatula.

Operation

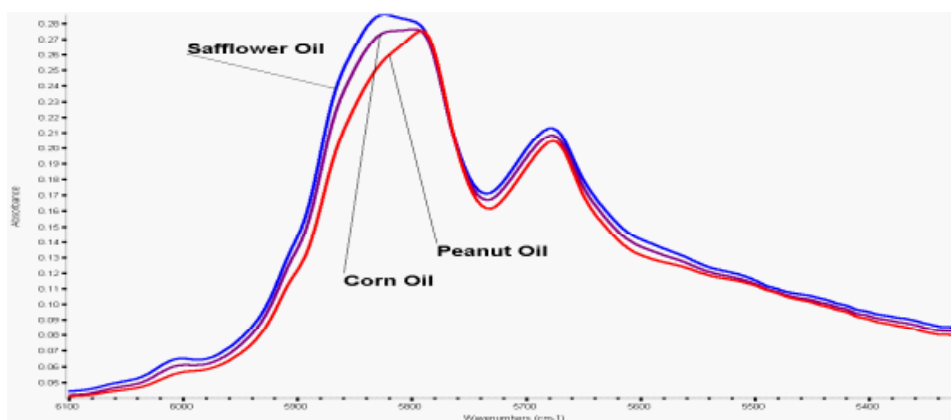
The Transflectance Cell is filled by applying a drop of the liquid, slurry or paste to the center of the gold reflectance surface. The cap, containing the near-infrared transparent window is then placed on top to spread the material evenly. The guiding pins lead the cap, then click in place to assure that the liquid is always the same distance from the window. The optical pathlength is always at least twice the physical thickness of the liquid layer. If the light is not perpendicular to the plane of the window, the pathlength is increased accordingly. The pathlength is adjustable by disassembling the cell and applying different spacers under the gold reflector.



Cleaning of the Cell

The Cell can be cleaned easily by opening the top of the cell and washing the exposed surfaces with soap and water. The gold surface is chemically resistant, thus washing with alcohol, acetone or similar solvents is possible.

- Near-Infrared measurement of different liquid, slurry, gel and paste samples
- Controlled pathway through the use of a diffuse reflector
- Useable with any near-infrared analyzer with reflectance sampling
- Easy sample application and cleaning



Near-Infrared spectra of edible oils. Using the MRC-912 Transflectance Cell, it is very easy to identify chemically-similar liquids or reproducibly quantify small changes, such as degree of unsaturation in this example.

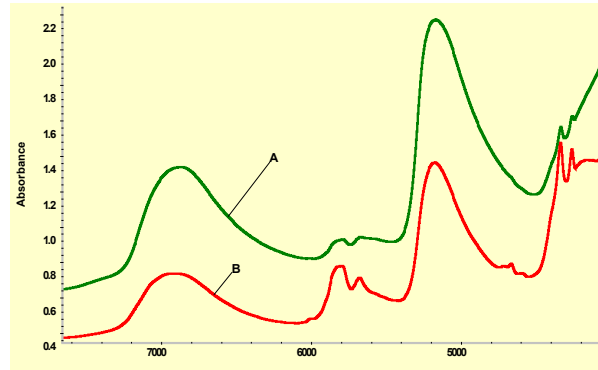
Optical pathlengths are twice the physical distance between the optical window and the diffuse gold reflector.

The MRC-912 cell can be calibrated to a predetermined pathlength by measuring the actual absorption of stable well-known materials and adjusting the distance to better than 0.0005".

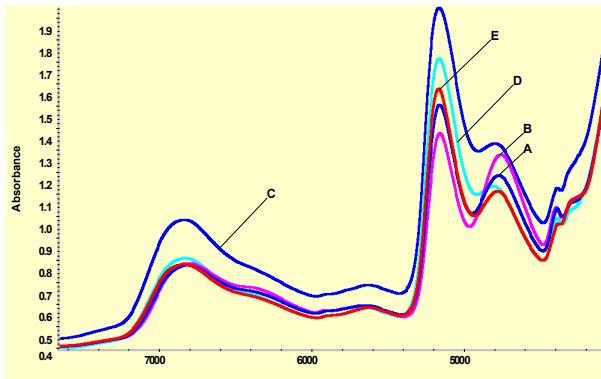
Typical pathlengths for aqueous samples are between 200-600 μm .



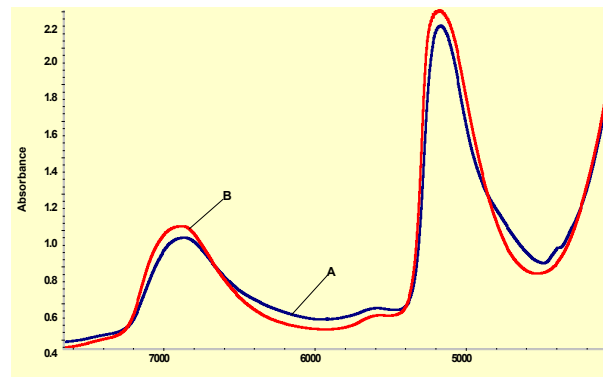
Examples of samples which are hard to present to a near-infrared analyzer using flow-through cells or conventional cuvettes. Viscous samples can be measured easily with the MRC-912 cell by applying a drop on the gold surface and closing the cell.



Near-Infrared spectra of A-Ketchup , B-Distilled water. Due to the high absorbance of water, it is beneficial to use the MRC-912 to measure all water containing products.



Near-Infrared spectra of high viscosity, high sugar concentration samples: A-Molasses, B-Honey, C-Chocolate Syrup, D-Dark Amber Maple Syrup, E-Corn Syrup.



Near-Infrared spectra of mayonnaise: A-Miracle Whip® , B-Vegenaise®.

Specifications

Product Number:	MRC-912-000
Cell Dimensions:	2.0" Diameter x 1.0"
Reflective Surface:	1.0" Diameter Diffuse gold
Pathlength:	0.5 mm nominal.
Calibrated:	0.3-1mm
Window Material:	NIR Borosilicate glass
Packaging:	Wood case

Ordering Information

MRC-912-000	Transflectance Liquid Cell
MRC-912-010	Pathlength adjustment and calibration
MRC-912-003	Gold Reflector (replacement part only)
MRC-912-004	Cell Top with Borosilicate window (replacement part only)
MRC-912-011	Window refurbishing (with Cell Top sent back to Middleton Research)
MRC-912-012	Gold Reflector refurbishing (includes reassembly and recalibration of Transflectance Cell)