



SPECTROSCOPY FIBERS

CeramOptec's fibers and various fiber probes are special flexible tools for remote spectroscopy in the wide range from UV to Mid Infrared (MIR): 0,2-16 μm .

Special pure silica core fibers, improved for UV (from 0,2 μm) or Near IR (to 2,5 μm), are designed with thin cladding for the high efficiency of coupling with spectrometer. Thin polymer jacket, as temperature resistant (to 380 $^{\circ}\text{C}$) polyimide coating, provides also the high coupling efficiency for very flexible fiber bundles. Fibers for spectrometer light delivery could be specially arranged (ring-catheter) or randomized (Y-shaped reflectance probe) with a fibers for signal detection. All bundles are suited in end's geometry with different FT-IR, Raman and other UV-VIS-NIR spectrometers.

Unique MIR-fiber probes, based on innovated bare core and core/clad polycrystalline Silver Halide fibers, provide the first opportunity for direct and evanescent remote spectroscopy in "finger-print" region of fundamental molecular vibrations 4-16 μm . They come with LN-cooled MCT-pig tail detectors and adjustable coupler for FT-IR spectrometers.

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Middle Infrared Fiber Accessory Kits for Remote IR-Spectroscopy MIFAK

Features

- Measurements in middle infrared region (4 - 16 μm or 2500 - 625 cm^{-1})
- Possibility of remote monitoring
- Diversified fiber probe configurations
- Easy expandibility and intgrebility

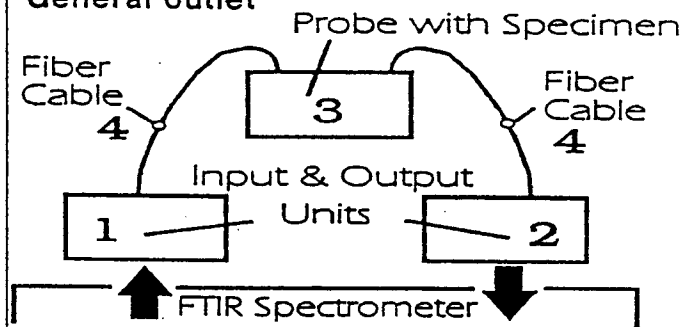
Applications

- Spectroscopic analysis of liquid solution in
 - chemical industry
 - food industry
 - enviroment pollutions
 - medicine
 - pharmacy

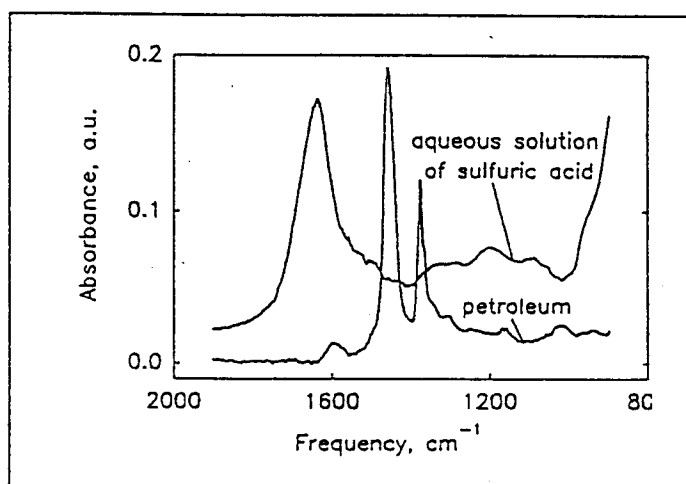
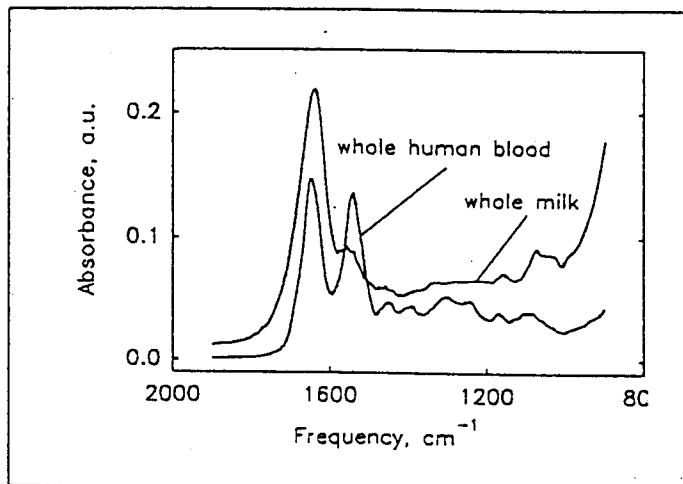
Components

- Adjustable input (1) and output (2) units specially adapted to FTIR spectrometer
- Various fiberoptical probes (3) and cables (4)

General outlet



Spectra obtained using the MIFAK



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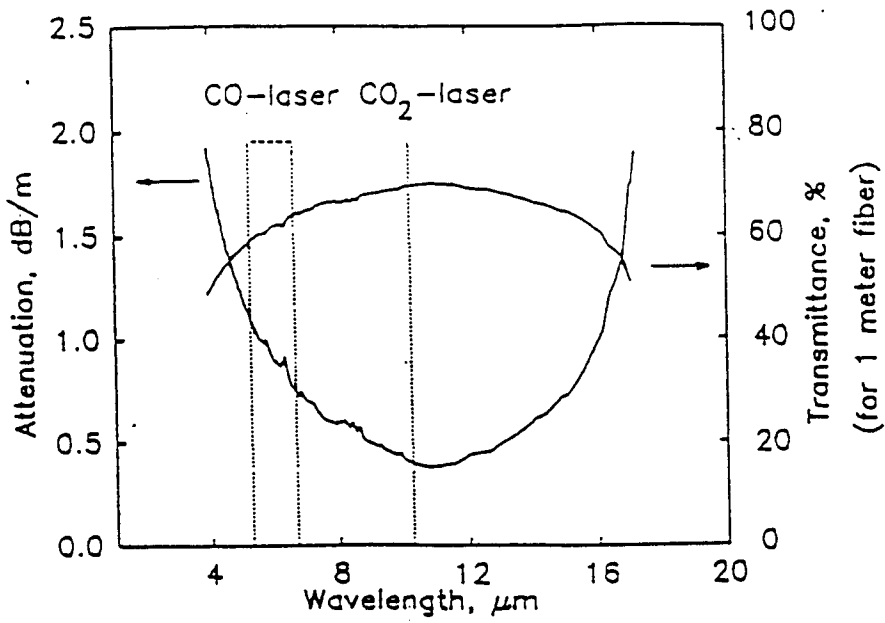


Fig.1 Spectra of transmittance and optical losses of MIR-fibers

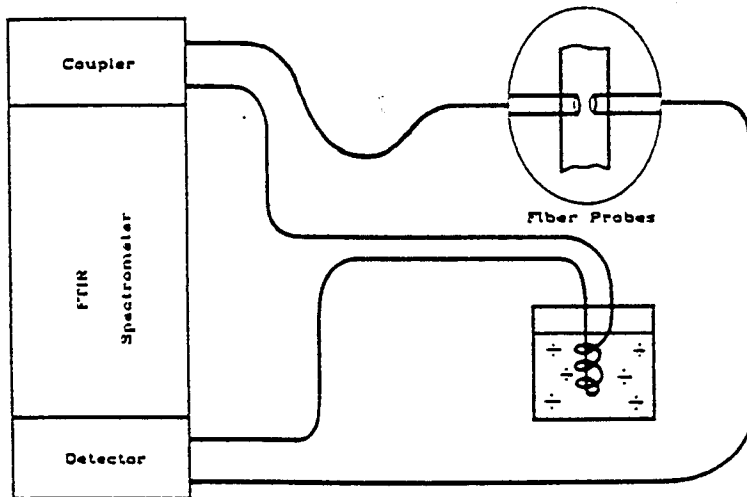


Fig.2 Scheme of MIR-fiber probes with FTIR-spectrophotometer

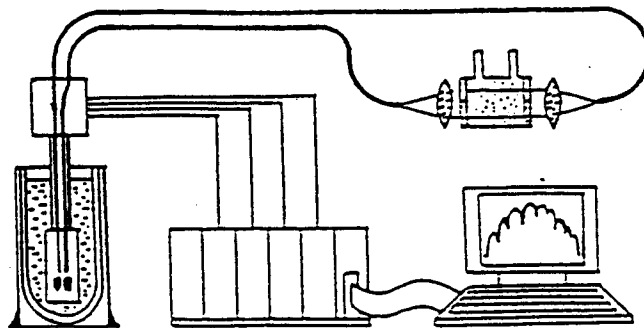
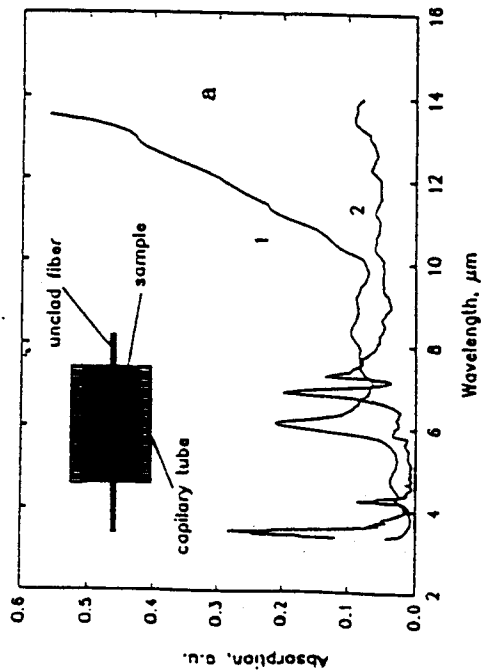
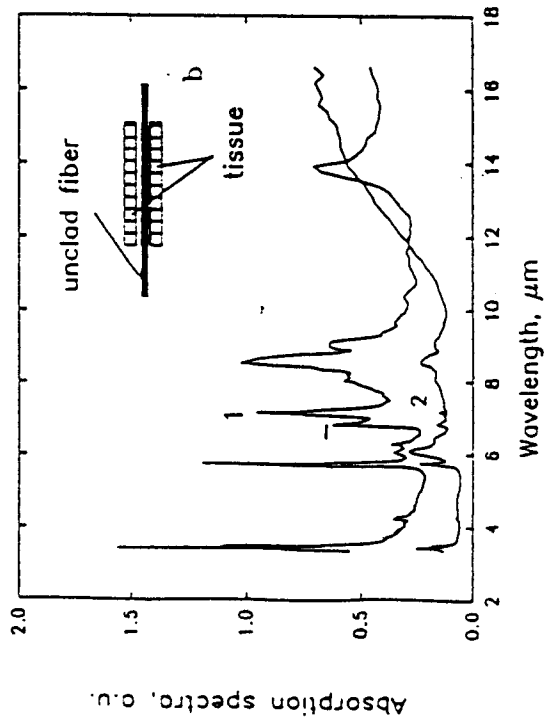


Fig.3 Scheme of TDL-spectrophotometer with MIR-fibers for gas analysis



Evanescent spectra of aqueous solution of sulphuric acid (1) and technical oil (2).



Evanescent spectra of adipose (1) and blood-forming (2) tissue.

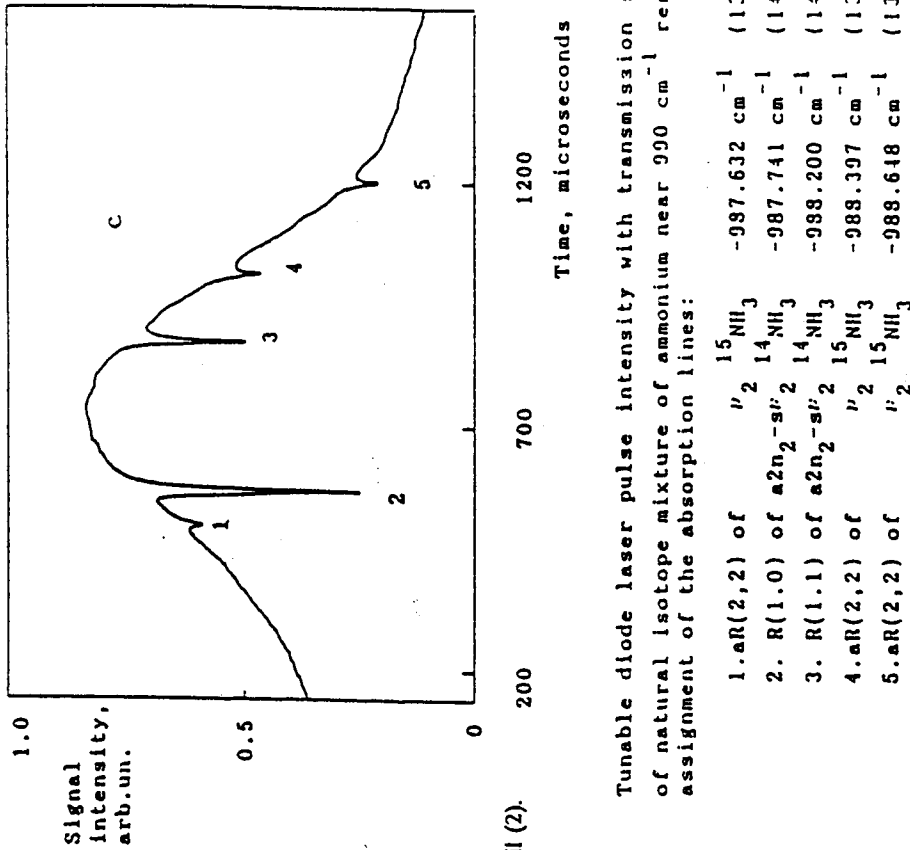


Fig.4 Examples of spectra, obtained with MIR-fiber evanescent probes (a,b) and FTIR-spectrophotometer, and TDL-spectra of NiI_3 with fiber multipass cell (c)

Tunable diode laser pulse intensity with transmission spectrum of natural isotope mixture of ammonium near 990 cm^{-1} region. An assignment of the absorption lines:

- | | | | |
|------------------------------------|--------------|---------------------------|-------|
| 1. aR(2,2) of ν_2 | $^{15}NiI_3$ | -997.632 cm^{-1} | (13), |
| 2. R(1.0) of a $2\nu_2$ -s ν_2 | $^{14}NiI_3$ | -987.741 cm^{-1} | (14), |
| 3. R(1.1) of a $2\nu_2$ -s ν_2 | $^{14}NiI_3$ | -988.200 cm^{-1} | (14), |
| 4. aR(2,2) of ν_2 | $^{15}NiI_3$ | -988.397 cm^{-1} | (13), |
| 5. aR(2,2) of ν_2 | $^{15}NiI_3$ | -988.648 cm^{-1} | (13). |

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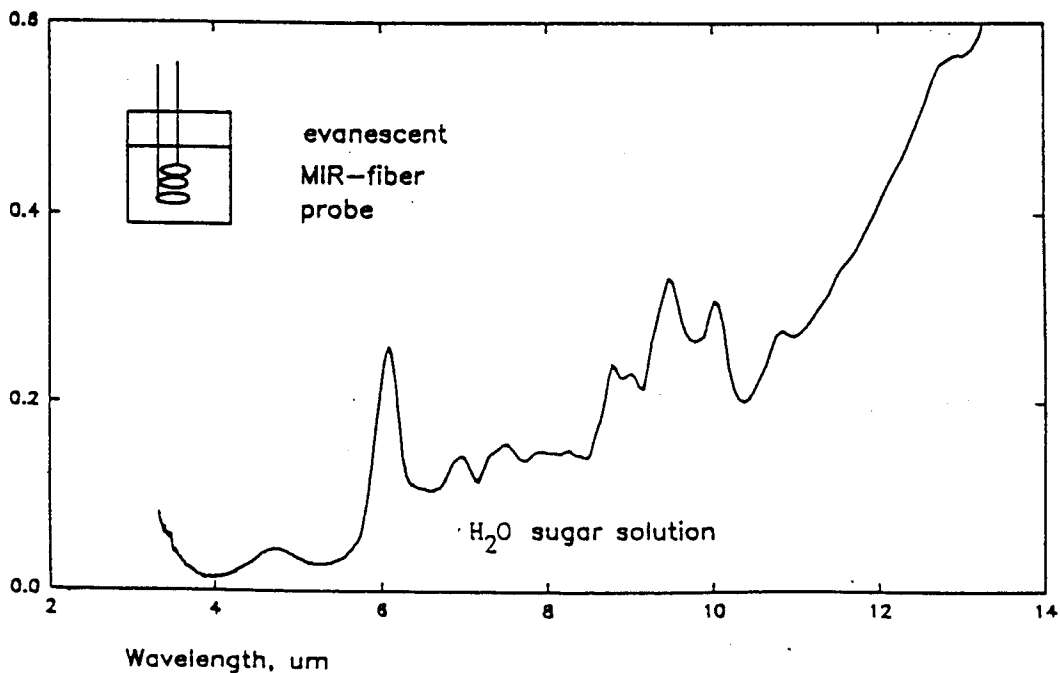
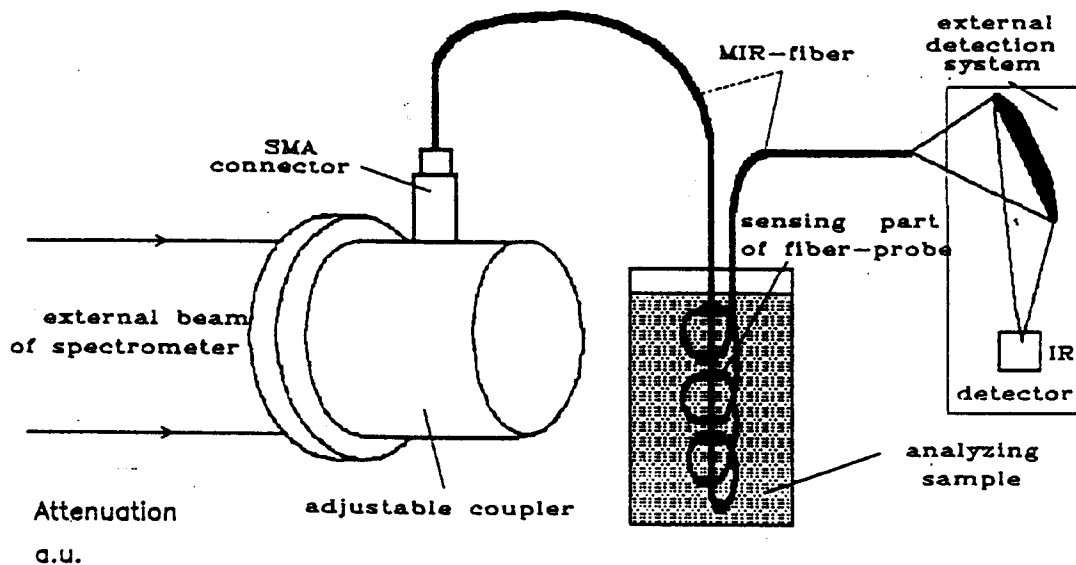
MIR-FIBER PROBE FOR REMOTE FTIR-SPECTROSCOPY (3 - 15 μ m)

MIR-fiber evanescent probe could be widely used with FTIR spectrophotometers for chemical analysis of liquids and gaseous substances. The accessory consists of three main parts:

1. Adjustable coupler unit to focus external beam of spectrophotometer to MIR-fiber,
2. MIR-fiber cable with evanescent probe,
3. Special HgCdTe (MCT)-detector connected-with MIR-fiber tail or standard IR detector with collecting mirror.

Specification.

Spectral range	3 - 15 μ m
Maximal diameter of spectrometer's external beam	34 mm
Divergency at the output end of fiber cable	60°
Fiber diameter	0.5, 0.7, 1.0 mm
Length of evanescent fiber active part	3 - 50 cm



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