**[FTIR Spectrometer](http://www.jh-inst.cas.cz/nanocentrum/instruments.php?stav=view_detail&dokument=6" \o "Zobrazit)**

**Equipment: FT-IR Spectrometer Nicolet 6700**

**No. of Equipment: UFCH8**

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**Equipment Description**

**Description of equipment:**

Infrared spectroscopy is analytical technique for qualitative and quantitative analysis.

Infrared spectroscopy deals with the interaction between a molecule and radiation from the IR region of the EM spectrum (IR region = 4000 - 400 cm-1). IR radiation causes the excitation of the vibrations of covalent bonds within that molecule.

FT-IR Spectrometer registers infrared spectrum (dependents of absorption and transmission of infrared radiation on wavelength). It is recalculate wavelength of infrared area into the audio frequency (kHz) and thus the detector is able to measured wavelength and its intensity.

**Specifications and technical features:**

Sample state: solid and liquid

ZnSe ATR crystal accessory is ideal for the analysis of almost any sample

Specular reflectance plate for analyzing coatings on reflective materials

Range Mid-IR (4000-400 cm-1)

4000-1000 cm-1 the ***functional group region***

< 1000 cm-1 the ***fingerprint region***

633 nm laser (HeNe red laser)

Software Omnic 8

**Specification of expertise relevant to NanoEnviCz workpackages:**

**WP3**a,c,d, **WP4**a, **WP5**b, **WP6**a-f

**Detailed description of expertise**

**Please, specify the main research topics connected with equipment**:

By Nicolet 6700 FT-IR Spectrometer is able to measure samples in solid or liquid phase, characterization and formation of synthetized materials (e.g. functional groups, type of bonds).

**Please, specify the secondary research topics connected with equipment**:

**Chemical reaction**

When sample undergoes a chemical reaction, some bands may decrease in intensity and new bands, due to products, may appear. Hence, some of the bands observed in the spectrum may vary in intensity with time.

Degradation of material on the surface area

**Keywords describing research area:**

Mid-IR, solid and liquid phase

**Competence**

**Relevance for applied and industrial research:**

Analysis of industrial products

Analysis of surfaces and thin leyers

**Relevance for fundamental studies:**

Qualitative and quantitative analysis

Surface analysis of solid material

Analysis of polymerization processes

Analysis of degradation of materials on the surface

**Comments**

Chemical and Physical Properties - for obvious reasons, the ATR crystal must be chemically and physically compatible with the sample. Some crystal materials may react with samples. This will typically damage the crystal surface and may produce unpleasant side effects. Optimal pH of sample is 5-9 for ZnSe crystal.

Refractive Index - the crystal should have a higher index of refraction than the sample. Refractive indices of standard ATR crystals span from 2.4 to 4.0.