**Mössbauer spectrometers**

**Equipment:** Mössbauer spectrometers

**No. of Equipment: UPOL4**

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**Equipment Description**

**Description of equipment:**

Mössbauer spectroscopy is a special type of gamma spectroscopy, which is used primarily for non-destructive studying of iron containing materials. Using this method, both qualitative and quantitative information about valence state and iron composition is obtained with extreme precision. For this purposes, our laboratory is equipped with several Mössbauer spectrometers. These instrument are working in transmission, conversion and backscattering regimes. It is possible to analyse both samples volume and surface. Samples can be analysed in both high temperatures (up to 1300 K) and low temperatures (down to 1.5 K). It is also possible to perform analyses in external magnetic field, up to 8T.

Mössbauer spectroscopy equipment is mostly designed and constructed directly in our laboratories.

Mössbauer spectroscopy is suitable for solid samples only (including frozen liquids).

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

**WP3**a,c-f,h **WP4**a,b **WP5**c, **WP6**a,f, **WP7**a-i, **WP8**a-f,

**Detailed description of expertise**

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

Iron-bearing compounds

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

Structural properties, magnetic properties

**Keywords describing research area:** nanoparticles, magnetism, structure

**Competence**

**Relevance for applied and industrial research:**

As a non-destructive technique, Mössbauer spectroscopy, provide information about local environment of studied samples. With the extreme precision can be recognize oxidation state, valence state and iron composition of measured sample.

**Relevance for fundamental studies:**

Mössbauer spectroscopy is a key technique in many fundamentals studies where is necessary to know the chemical and physical nature of studies samples. Based on measured spectra and its hyperfine parameters, it is possible to determine the chemical bonds, spin-state or particle size distribution. Combine the results from magnetic measurements, EPR and Mössbauer spectroscopy the whole magnetic behavior of measured sample can be determine.