**HRSEM FEI NanoSEM 450**

**Equipment:** High resolution scanning electron microscope FEI Nova NanoSEM 450

**No. of Equipment:UACH4**

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**Equipment Description**

**Description of equipment:**

FEI Nova NanoSEM™ scanning electron microscopes combine best-in-class imaging with superb analytical performance in one easy-to-use instrument. It is a high resolution scanning electron microscope, with two modes of measuring and five different detectors. The basic detector Everhart-Thornley Detectoris (ETD). High resolution detector "Through-the-Lens" (TLD). Low Vacuum Detector (LVD), witch is used at pressure of 10-200 Pa. Concentric Backscattered Detector (CBS) uses four concentric segmentation of the detector diode. Scanning Transmission Electrons Microscopy Detector (STEM) has a two segments of solid-state diode mounted underneath the TEM grids holder.

The table with samples can be tilted in a range from -15° to 75°.

The Field-Free mode can be used with all detectors. This mode is used for view a preview image and for measuring of magnetic samples. The accelerating voltage isn’t limited in this mode and the entire voltage range from 1kV to 30kV can be used.

The second mode uses an immersion lens to view a sample, so mode is called Immersion. TLD detector is mainly used and it’s achieved ultra-high resolution (UHR). LVD, CBS and STEM detectors can be used also with immersion lens for better resolution. This Immersion mode can not be used for magnetic samples.

Samples can be plated with a thin layer of different metals or steamed by carbon. This conductive thin layer on the sample surface reducing particle charging in the microscope.

Samples can be also cleaned in external UV-prep at high vacuum. This process destroys organic pollutants on surfaces. Plasma cleaning of sample in the microscope is commonplace.

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

**WP3**a,c,d,f,g,h, **WP4**a,b, **WP6**a,c-,f **WP7**a,b,c,g, **WP8**e,f

**Detailed description of expertise**

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

**Measuring of morphology of prepared nanomaterials**

Metal oxides

Graphene, carbon nanotubes

Composite materials.

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

Graphic measuring of the size particle with non-spherical shape.

**Keywords describing research area:**

Characterization of nanomaterials, Imaging of morphology, Agglomerates of nanoparticles

**Competence**

**Relevance for applied and industrial research:**

Reproducible and fast measurements.

Checking of composite materials and agglomeration of nanoparticles

**Relevance for fundamental studies:**

Rapid measurement of samples taken from the synthesis.

Online monitoring of particle growth.