**ICP-OES Optical Emission Spectrometer OPTIMA**

**Equipment: ICP spectrometer OPTIMA**

 **(included in the Laboratory for Synthesis and Testing of Sorbents)**

**No. of Equipment: UJEP17**

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**Equipment Description**

**ICP-OES: Optical Emission Spectrometer Optima 8000 (Perkin-Elmer)**

Dual-view optical system (axial/radial)

High-dispersion echelle grating

Spectral range 165-900 nm with resolution of < 0.009 nm (200 nm)

Sequential reading

Dual backside-illuminated Charge-Coupled Device (CCD) array detector

Plasma/nebulizer/auxiliary gas: argon

Cross-flow nebulizer, Scott spray chamber

Autosampler S10

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

**WP3**e,f, **WP4**a,b **WP5**c, **WP6**a,b,e, **WP7**a-d,f,i

**Detailed description of expertise**

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

Development of new (nano)materials for liquid-phase adsorption removal of diverse pollutants from waters. Study of the sorption mechanisms and kinetics.

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

Application of specifically designed (nano)materials for destruction of highly toxic compounds, e.g. organophosphates (pesticides, chemical warfare agents). Study of the reaction mechanisms and kinetics. Study of the interactions of (nano)materials with some biologically relevant organophosphate compounds.

**Keywords describing research area:**

Liquid-phase adsorption; Reactive sorption; Degradation of toxic compounds

**Competence**

**Relevance for applied and industrial research:**

**Functional testing of sorbents**

Complete characterization (in cooperation with partners) and functional testing of (nano)materials for liquid-phase adsorption and reactive sorption towards pre-determined model compounds (heavy metals, inorganic ions and oxoanions, synthetic dyes, polar and non-polar aromatics, …) or customer-specified pollutants, study of the sorption mechanisms, determination of sorption characteristics (capacity, selectivity, parameters of sorption isotherms, kinetic parameters)

**Reactive sorption testing**

Study of the degradation of highly toxic compounds on specifically designed (nano)materials by the mechanisms of reactive sorption. Testing of the degradation kinetics and efficiency towards selected model compounds (e.g. organophosphate pesticides). On a special request, the decontamination study with real chemical warfare agents (soman, VX agent, sulphur mustard) may be performed in cooperation with partners.

**Relevance for fundamental studies:**

Studying the mechanisms and kinetics of liquid-phase adsorption and reactive sorption