**ICP-OES**

**Equipment:** *ICP-OES iCAP PRO*

**No. of Equipment:** *TUL17*

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**Equipment Description**

Inductively coupled plasma optical emission spectrometry (ICP-OES) is designed to measure elemental concentrations in aqueous solutions. The instrument is capable of measuring a large range of concentrations of different elements in a single sample.

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

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| --- | --- |
| **WP3 SYNTHESIS AND DESIGN OF NEW MULTIFUNCTIONAL NANOMATERIALS FOR ENVIRONMENT PROTECTION** | |
| Conceptually new nanostructured materials with the potential for application in innovative technologies |  |
| Computer aided nanomaterials design |  |
| Low dimensional materials and their composites (carbon dots, nanotubes, graphene derivatives) |  |
| Nanofibers |  |
| Magnetic hybrids |  |
| Metal and metal oxide NPs | x |
| Redox active nanomaterials |  |
| Nanomaterials for biomedical applications |  |
|  | |
| **WP4 HETEROGENEOUS CATALYSIS FOR ENVIRONMENTAL PROTECTION** | |
| Nanomaterials for catalytic degradation of pollutants in water, soil and air |  |
| Nanostructured heterogeneous catalysts for abatement of pollutants from industrial processes and automotive transport |  |
| New “clean” catalytic processes for chemical production |  |
|  | |
| **WP5 NOVEL NANOMATERIALS AND TECHNOLOGIES FOR SUSTAINABLE PRODUCTION** | |
| Processes and technology for sustainable energy and chemical production |  |
| Catalytic processes for transformation of natural gas to liquids |  |
| Nanomaterials for utilization of renewables; Magnetically separable green catalysts |  |
|  | |
| **WP6 EFFECTIVE PHOTOCATALYTIC TECHNOLOGIES** | |
| Mastering nanomaterials for photocatalysis |  |
| Effective photocatalytic processes |  |
| Photovoltaic paints |  |
| Functional surfaces for environmental protection |  |
| Hybrid materials combining photocatalysts and heterogeneous catalysts |  |
| Thin photocatalytic films for direct solar splitting of water |  |
|  | |
| **WP7 NANOTECHNOLOGY FOR TRAPPING AND CHEMICAL DEGRADATION OF POLLUTANTS** | |
| Nanomaterials for sorption |  |
| Natural based nanomaterials produced by “green” technology |  |
| Reactive sorbents for degradation of pesticides and highly toxic agents |  |
| Degradation of chemical warfare agents |  |
| Analysis of filtering capabilities of nanomaterials |  |
| Elimination of radionuclides contamination |  |
| Modified nanofiber filters; Advanced antimicrobial filters/membranes |  |
| Nanoiron for groundwater and waste water treatment |  |
| Nano-trapping of heavy metals |  |
|  | |
| **WP8 SENSING AND MONITORING OF POLLUTANTS** | |
| Efficient sensing of pollutants | x |
| Biosensing by new devises |  |
| Application of new sensors in monitoring of pollutants |  |
| Magnetic sensors; Magnetically assisted SERS sensors |  |
| Advanced electrochemical sensors |  |
| Graphene based nanosensors |  |
|  | |
| **WP9 TOXICITY AND RISKS OF NANOMATERIALS** | |
| Health risks |  |
| Environmental risks |  |
| „In vitro“ and „in vivo“ toxicity tests – cytotoxicity, genotoxicity, interactions with membrane |  |
| RNA gene expression changes and protein expression changes |  |
| Complete eco/aquatoxicity ecotoxicity evaluation | x |
| Toxicity against bacteria and fungi |  |

**Detailed description of expertise**

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

*ICP-OES iCAP PRO* can be used for:

* Measurement of metal concentration

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

* Measurement of drinking water and wastewater

**Keywords describing research area:**

Water, metals, concentration measurement

**Competence**

**Relevance for applied and industrial research:**

This equipment (commonly used at TUL) allows to study the concentration of metals in aqueous solutions and thus to study the purity of water from the environment, at the same time it is possible to measure elements that are not present in the environment, but occur for example in industry or science. ICP-OES can also be used to study new materials thanks to the possibility of digesting samples and converting them into aqueous solutions.

**Relevance for fundamental studies:**

Thanks to its sample digestion capabilities, the instrument can be used for the analysis of rocks, minerals, biological materials, etc.

**Comments**

The guest user can use the device independently under the operator's supervision or as custom analyses wholly performed by the operator.