**EQUIPMENT**

Cena přístroje: 1 930 700 Kc

**Equipment:** FRA - PhotoEchem System

**No. of Equipment: (will be assigned)**

**Responsible coordinator:** Prof. RNDr. KAVAN Ladislav, CSc., DSc.

**Name of Institution:** J. Heyrovsky Institute of Physical Chemistry of the ASCR, v. v. i.

**Address of Institution:** Dolejškova 2155/3, 182 23 Prague 8, Czech Republic

**E-mail:**

**Telephone:**

**Homepage:** http://www.jh-inst.cas.cz/www/index.php?p=1

**Contact person:** Ing. Hana Krýsová, Ph.D.

**E-mail:** hana.krysova@jh-inst.cas.cz

**Telephone:** (+420) 26605 3926

**Equipment Description**

Description of equipment: Integrated electrical and optical measurement system.

Set-up for electrochemical measurements including Frequency Responce Analyzer interfaced to electrochemical impedance spectroscopy, Potentiostat/Galvanostat, Solar simulator and IPCE module.

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

|  |
| --- |
| **WP3 SYNTHESIS AND DESIGN OF NEW MULTIFUNCTIONAL NANOMATERIALS FOR ENVIRONMENT PROTECTION** |
| Conceptually new nanostructured materials with the potential for application in innovative technologies | x |
| Computer aided nanomaterials design |  |
| Low dimensional materials and their composites (carbon dots, nanotubes, graphene derivatives) | x |
| Nanofibers | x |
| Magnetic hybrids |  |
| Metal and metal oxide NPs | x |
| Redox active nanomaterials | x |
| Nanomaterials for biomedical applications | x |
|  |
| **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 | x |
| 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 | x |
|  |
| **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 |  |
| 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 |  |
| Toxicity against bacteria and fungi |  |

**Detailed description of expertise**

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

Electrochemical characterization of materials; electrochemical impedance spectroscopy measurements, wide range of techniques including CV, CC-CV charge/discharge, differential pulse voltammetry, linear sweep voltammetry, and the equivalent potentiometry techniques.

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

Characterization of a range of photoelectrochemical materials and devices such as DSSCs, Perovskite cells and electrode materials; I-V analysis including fill factor and efficiency, IPCE.

**Keywords describing research area:**

DSSCs, electrochemical impedance spectroscopy, IPCE, I-V analysis

**Competence**

**Relevance for applied and industrial research:**

Electrochemical and photoelectrochemical characterization of materials and devices such as DSSCs and Perovskite cells.

**Relevance for fundamental studies:**

Electrochemical and photoelectrochemical characterization of materials and devices such as DSSCs and Perovskite cells.

**Comments**