**UJEP 16**

completed by responsible coordinator of equipment

**Equipment: GC-qMS Agilent**

**No. of Equipment: UJEP16**

**Responsible coordinator: Doc. Dr. Ing. Pavel Kuráň**

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**Equipment Description**

Gas chromatograph Agilent 7980 with electron ionization and simple quadrupole detection (MS 5977E) equipped with autosampler CombiPAL for liquid, headspace and SPME sample introduction. Agilent MassHunter Workstation Software is used for data acquisition and analysis.

**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 |  |
| Computer aided nanomaterials design |  |
| Low dimensional materials and their composites (carbon dots, nanotubes, graphene derivatives) |  |
| Nanofibers |  |
| Magnetic hybrids |  |
| Metal and metal oxide NPs |  |
| Redox active nanomaterials |  |
| Nanomaterials for biomedical applications |  |
|  | |
| **WP4 HETEROGENEOUS CATALYSIS FOR ENVIRONMENTAL PROTECTION** | |
| Nanomaterials for catalytic degradation of pollutants in water, soil and air | YES |
| Nanostructured heterogeneous catalysts for abatement of pollutants from industrial processes and automotive transport | YES |
| New “clean” catalytic processes for chemical production | YES |
|  | |
| **WP5 NOVEL NANOMATERIALS AND TECHNOLOGIES FOR SUSTAINABLE PRODUCTION** | |
| Processes and technology for sustainable energy and chemical production | YES |
| Catalytic processes for transformation of natural gas to liquids | YES |
| Nanomaterials for utilization of renewables; Magnetically separable green catalysts | YES |
|  | |
| **WP6 EFFECTIVE PHOTOCATALYTIC TECHNOLOGIES** | |
| Mastering nanomaterials for photocatalysis | YES |
| Effective photocatalytic processes | YES |
| Photovoltaic paints |  |
| Functional surfaces for environmental protection | YES |
| 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 | YES |
| Natural based nanomaterials produced by “green” technology | YES |
| Reactive sorbents for degradation of pesticides and highly toxic agents | YES |
| Degradation of chemical warfare agents | YES |
| Analysis of filtering capabilities of nanomaterials | YES |
| 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 | Yes |
| Magnetic sensors; Magnetically assisted SERS sensors |  |
| Advanced electrochemical sensors |  |
| Graphene based nanosensors |  |
|  | |
| **WP9 TOXICITY AND RISKS OF NANOMATERIALS** | |
| Health risks | YES |
| Environmental risks | YES |
| „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**:

Identification and quantification of various volatile organic compounds from chemical processes (e.g. environmental pollutants, volatile organic acids). Qualitative and quantitative analyses of organic compounds in more complex matrices with the focus on polar components.

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

Identification of corrosive gases released during biomass pyrolysis and bio-oil itself with the focus on the polar volatile organic compounds. Quantification of PLFA.

**Keywords describing research area:**

Qualitative and quantitative analysis, volatile organic compounds, volatile organic acid, identification of polar compounds.

**Competence**

**Relevance for applied and industrial research:**

Identification and quantification of volatile organic compounds from technological processes.

**Relevance for fundamental studies:**

Products identification and quantification from various chemical processes.

Study of the reaction mechanism(s) or degradation (e.g. time-dependence stability of corrosive gases with focus on polar components).

**Comments**