**WDXRF spectrometer Rigaku Primus IV**

completed by responsible coordinator of equipment

**Equipment: WDRF spectrometer Rigaku Primus IV**

**No. of Equipment: UJEP 37**

**Responsible coordinator: prof. RNDr. pavla Čapková, Dr. Sc.**

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**Equipment Description**

Tube-above wavelength dispersive X-ray spectrometer for fast elemental analysis of powders, liquids and bulk materials in range F-U. This spectrometer is equipped with micromapping utility for analysis of defects and for mapping of chemical composition.

**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) |  |
| Nanofibers |  |
| Magnetic hybrids |  |
| Metal and metal oxide NPs |  |
| 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 | x |
| Nanostructured heterogeneous catalysts for abatement of pollutants from industrial processes and automotive transport | x |
| 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 | x |
| Nanomaterials for utilization of renewables; Magnetically separable green catalysts | x |
|  | |
| **WP6 EFFECTIVE PHOTOCATALYTIC TECHNOLOGIES** | |
| Mastering nanomaterials for photocatalysis |  |
| Effective photocatalytic processes |  |
| Photovoltaic paints |  |
| Functional surfaces for environmental protection | x |
| Hybrid materials combining photocatalysts and heterogeneous catalysts | x |
| Thin photocatalytic films for direct solar splitting of water |  |
|  | |
| **WP7 NANOTECHNOLOGY FOR TRAPPING AND CHEMICAL DEGRADATION OF POLLUTANTS** | |
| Nanomaterials for sorption | x |
| Natural based nanomaterials produced by “green” technology |  |
| Reactive sorbents for degradation of pesticides and highly toxic agents | x |
| Degradation of chemical warfare agents | x |
| 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**:

Fast analysis of powders, bulk materials, layers and liquids without any complicated sample preparation.

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

Mapping of the sample surface, analysis of defects.

**Keywords describing research area:**

Elemental analysis, WDXRF spectrometry, Thin layer analysis, Analysis of defects

**Competence**

**Relevance for applied and industrial research:**

WDXRF is fast and precise method for elemental analysis of wide range of samples. The analysis could be routine and very fast.

**Relevance for fundamental studies:**

Our device is equipped with micro-mapping utility which could be used for analysis of defects and also for thin layers analysis.

**Comments**