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Lappeenranta *University of Technology*

Lappeenranta University of Technology



Laboratory of Green Chemistry



Laboratory of Green Chemistry

Laboratory of Green Chemistry has specialized in analytics and water and wastewater purification techniques:

- advanced water treatment
- environmental analytics and monitoring

› Facts

- Head of the laboratory Prof. Mika Sillanpää
- international staff ca. 30 (2013)
- turnover ca. 3,3 M€ (2013)

LGC conducts research work in finding new solutions to prevent and decrease environmental pollution and developing novel materials and processes for water purification applications.

Research areas

- Adsorption
- Advanced Oxidation Processes (AOPs)
- Electrochemical treatment
- Analytics and online monitoring

Adsorption

- **Ongoing research**
 - Nano- and microcellulose based materials for water treatment applications (NaCeWa)
 - Low-cost adsorbents for the treatment of mining wastewaters
 - Hydrothermally carbonized biomass for (WetPyro)
 - Recovery of nutrients by adsorption
- **Previous research**
 - Nanosorbents for heavy metal extraction from low concentrations (MONIWATER)
 - Nanosorbents produced by biosynthesis from natural products and indigenous minerals
 - Preparation of activated carbon from natural products
 - Functionalized adsorbents for heavy metal removal (UMASYS)

Advanced Oxidation Processes (AOPs)

- **Ongoing research**
 - Nanotechnology in advanced oxidation process; a green process for the treatment of toxic organics present in water and wastewater
 - LED-based photocatalysis for water treatment
 - Disinfection by UV-LED radiation
 - Hybrid membrane process for water treatment
 - Sonoelectrocatalysis in water treatment
- **Previous research**
 - Catalytic Degradation of Persistent Organic Pollutants
 - Sonochemically-assisted Electrochemical Treatment
 - Nanolyst – Nanostructured materials for Catalytic Oxidation
 - Novel Materials and Systems for Degradation of Organic Pollutants
 - AOP's in Treatment of Pulp and Paper Mill Wastewaters
 - UV LED and ALD-coated Photocatalysts in Water Treatment
 - Novel micro- and nanostructured semiconductors and their photocatalytic properties

Electrochemical technologies

- **Ongoing research**
 - Electrochemical oxidation
 - Electrochemical coagulation
 - Electrokinetic remediation
 - Electro-Fenton process

Analytics and online monitoring

- **Ongoing research**
 - IMS Quantitative Analysis
 - IMS and Sample Introduction Methods
 - Carbonized cellulose films in sensor applications
 - Protection of Waters in Egypt
 - Water quality of the "Water Tower of Asia" – Tibetan Plateau
 - Environmental organics
- **Previous research**
 - Developing alternative, nonradioactive ionization methods for IMS
 - Quantitative analysis additives called dopants
 - Thermal evaporation of ionic liquids and determination by IMS
 - Effect of humidity in IMS have been previously studied.
 - Ion sensing on junction
 - DNA sensors in environmental analysis

Laboratory equipments

- Total organic carbon analyzer
- Capillary Electrophoresis System
- FTIR
- Gas Chromatography system
- High-performance liquid chromatography
- ICP-OE Spectrometer
- Inert mass selective detector
- Surface Area and Pore Size Analyzer
- Viscotester
- UV/Vis Spectrometer
- Zetasizer