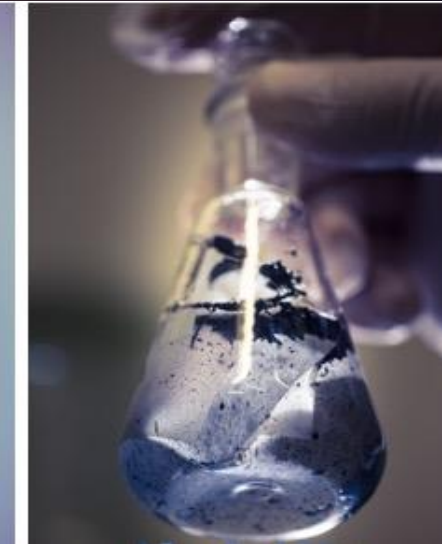




Zakład Chemii Środowiskowej
Wydział Chemii UMCS

Zakład Chemii Środowiskowej

Kierownik:

dr hab. Patryk Oleszczuk, prof. UMCS

Skład:

dr hab. Bożena Czech (p.o. kierownika)

dr Wiesława Ćwikła-Bundyra (pracownik techniczny)

dr Agnieszka Marcewicz-Kuba (starszy wykładowca)

dr Anna Siatecka

doktoranci:

mgr Aleksandra Bogusz – projekt Preludium

mgr Paulina Godlewska



www.zchs.umcs.lublin.pl

Najnowsze informacje dotyczące:

- funkcjonowania Zakładu,
- prowadzonych badań,
- aktualnych osiągnięć,
- promocji nauki.

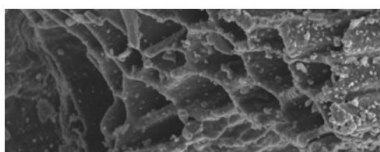


Contaminants bioavailability

About Department of Environmental Chemistry

Our research is mainly focused on fate (especially bioavailability and ecotoxicity) of different contaminants in environment as well as the development and improvement of methods to removing these contaminants from water, soil and sediments. Most recent works are focused on fate of nanoparticles in soil, sediment and sewage sludges and the effect of these materials on living organisms. We also investigate the use of biochars, activated carbon and carbon nanotubes as an adsorbent for organic contaminants removal from water, soil and sewage sludge. The important part of our research are photocatalysis for water treatment. We are also interested in all kinds of processes related to interactions between environmental compartments (soil, water, atmosphere, waste materials) and improvement of analytical procedures/techniques in environmental chemistry.

Research



Biochar for water and soil remediation



Ecotoxicology and risk assessment



Nanoparticles in environment



Environmental catalysis

Recent published/accepted papers

Article | 22 January 2018

Changes in the freely dissolved polycyclic aromatic hydrocarbons (PAHs) content in soil amended sewage sludge with biochar

Stefaniuk M., Tsang D.C.W., Ok Y.S., Oleszczuk P.
J. Hazard. Mat.



Article | 21 January 2018

Changes of total and freely dissolved polycyclic aromatic hydrocarbons and toxicity of biochars treated with various aging processes

Oleszczuk P., Kottowski M.
Environ. Pollut.



News

Tweets by @ZChSChem

Patryk Oleszczuk @ZChSChem
Masa ciśnie w dół !!!



Jan 27, 2018

Patryk Oleszczuk @ZChSChem
The best opinion about Polish science
[youtube.com/watch?v=QdBPp8...](https://www.youtube.com/watch?v=QdBPp8...)

YouTube @YouTube



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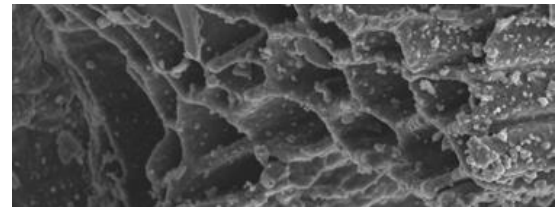
Announcements for students



Zakład Chemii Środowiskowej



- Charakterystyka i wykorzystanie biowęgla w remediacji i rekultywacji obszarów skażonych i zdegradowanych,
- Ocena jakości środowiska (gleby, osady denne, wody, osady ściekowe) przy zastosowaniu metod chemicznych i ekotoksykologicznych,
- Wpływ nanomateriałów na środowisko,
- Zastosowanie metod fotokatalitycznych w oczyszczaniu wód i ścieków.



Projekty badawcze

H2020-MSCA – dr hab. P. Oleszczuk, prof. UMCS

Effect of water and wastewater treatment on the properties of engineered nanomaterials (ENMs) in the context of their fate, toxicity and interaction with other contaminants (SAFEnano)

H2020-MSCA-IF-2015, No. 699794, realizowany we współpracy z Department of Civil and Environmental Engineering, Duke University, USA



Projekty badawcze

OPUS 13 – dr A. Siatecka

**Badanie wpływu starzenia biowęgla na ich
właściwości oraz oddziaływanie
z zanieczyszczeniami organicznymi
i nieorganicznymi w kontekście ich toksyczności**
NCN, 2017/25/B/NZ8/02191



Projekty badawcze

Preludium 14 – mgr Aleksandra Bogusz

**Wpływ procesu starzenia oraz obecności
zanieczyszczeń organicznych i nieorganicznych na
ekotoksyczność mikroplastików**

Konsorcjum naukowe - Lider: Instytut Ochrony
Środowiska - Państwowy Instytut Badawczy, Partner:
Uniwersytet Marii Curie Skłodowskiej
w Lublinie



Współpraca naukowa

Mark Wiesner, Duke University, USA

Baoshan Xing, University of Massachusetts in Amherst, USA

Danny D. Reible, Texas Tech University, USA

Yong Sik Ok, Korea University, Korea Południowa

Daniel Tsang, Hong Kong Polytechnic University

Yanzheng Gao, Nanjing Agricultural University, Chiny

Bo Pan, Kunming University of Science and Technology, Chiny

Thomas Bucheli, Agroscope, Szwajcaria

Mirabbos Hojamberdiev, Shinshu University, Japonia

Kamyar Shirvani Moghaddam, Deakin University, Australia



Wyposażenie

Chemical analysis

GC-MS



Thermo Scientific Trace 1300 Gas Chromatograph with Thermo Scientific ISQ LT mass spectrometer

GC-MS is used for determination of organic contaminants in different environmental and anthropogenic samples. We can analyze the total as well as bioavailable and bioaccessible concentration of polycyclic aromatic hydrocarbons (PAHs) in different environmental samples. Other anthropogenic organic contaminants can be also analyzed, e.g. phthalates, polybrominated diphenyl ethers (PBDEs), etc.

ICP-OES



Thermo Scientific iCAP™ 7200 ICP-OES Analyzer

Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES) is an established and powerful technique for the analysis and quantification of trace elements in both liquid and solid samples. In our lab ICP-OES is used for determination of trace elements including the most dangerous heavy metals (Cd, Pb, Cr, etc) in many different samples (mainly soils, biosolids, biochars and plants).

TOC/N analyzer



TOC/N analyzer is used for determination of organic carbon in solid matrices and organic carbon and nitrogen in liquid solutions

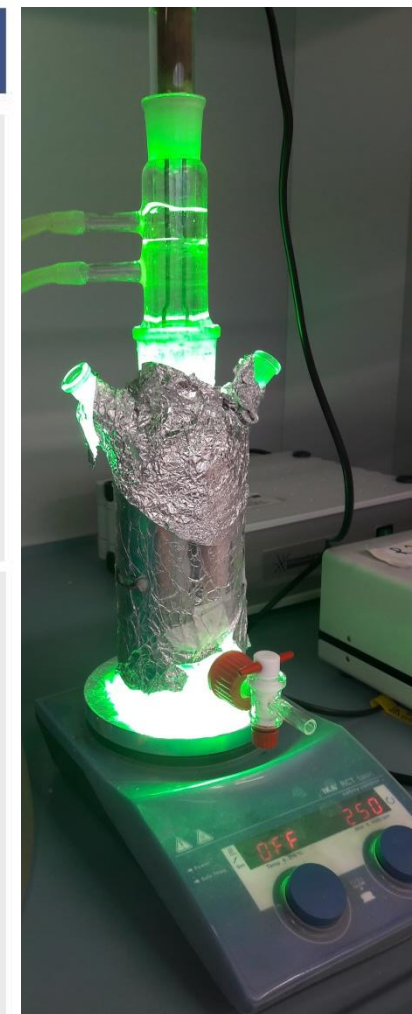
Capable of TC, IC, TOC (= TC-IC), and NPOC measurement; options enable POC (volatile organic carbon), TOC via POC + NPOC, and even TN (total nitrogen) measurements. In our lab TOC/N analyzer is used mainly for determination of total organic carbon in environmental (soil, water, sediments) and anthropogenic (sewage sludge, biochar, compost) matrices.

Pyrolysis unit



Professional Pyrolysis Unit for biochar production Czylok (Poland)

The unit is used for biochar production from different feedstock, in different temperatures and carrier gases.



Ekotoksykologia

Ecotoxicological equipment and methods



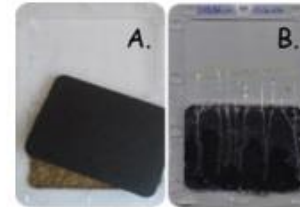
Microtox system

The Microtox® Toxicity Test is used to evaluate the inhibition of the luminescence of *Vibrio fischeri* in water extracts from different matrices. The tests is carried out using a Microtox M500 analyser.



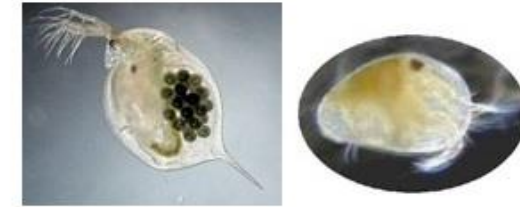
Collembola test

The test is carried out with *Folsomia candida* according to the ISO guideline 11267 (ISO, 1999). The mortality and reproduction of *F. candida* is monitored. Juveniles of *F. candida* are exposed for contaminated different environmental and anthropogenic matrices.



Phytotoxicity tests

The phytotoxkit microbiest measures the decrease of seed germination and of the growth of the roots after 3 days of exposure of seeds of selected plants to matrix. The analyses and the length measurements were performed using the Image Tool 3.0.



Crustaceans test

Crustaceans tests are carried out with *Daphnia magna* and *Heterocypris incongruens*. The Daphnia test is performed in accordance with the OECD and ISO. The test with *H. incongruens* is performed using the ostracod test kit (Ostracodtoxkit F).

Other equipment and instrumentation



Zapraszamy!!!



Patryk Oleszczuk, Ph.D., Prof. UMCS

Head of dEC (PI)

Short CV: MS - 1999, Ph.D. - 2004, D.Sc. - 2010

Biochar for water and soil remediation, application and implication of nanotechnology, ecotoxicology



Bożena Czech, Ph.D., D.Sc.

Associate professor

Short CV: MS - 2002, Ph.D. - 2006, D.Sc. 2018

Advanced method of organic contaminants removal from water and wastewater



Anna Siatecka, Ph.D.

Post-doc

Short CV: MS - 2012, Ph.D. - 2016

Sewage sludge-derived biochars, biochar aging, interaction between biochar and contaminants



Agnieszka Marcewicz-Kuba, Ph.D.

Associate professor

Short CV: MS - 1994, Ph.D. - 2003



Wiesława Ćwikła-Bundyra, Ph.D.

Technical/Administrative assistant

Short CV: MS - 1990, Ph.D. - 2003

Nano-biochars, dissolved organic carbon, polycyclic aromatic hydrocarbons



Aleksandra Bogusz, M.S.

Ph.D. student

Short CV: MS - 2012, Ph.D. - 2016

Interactions between biochars and trace metals, remediation of soils contaminated by heavy metals, plastics in environment



Paulina Godlewska, M.S.

Ph.D. student

Short CV: MS - 2017

Polycyclic aromatic hydrocarbons in sewage-sludge derived biochars-amended soils, composting, engineered biochars, ecotoxicity



Katarzyna Araucz, BS

MS student/Research assistant

Short CV: BS - 2017

Effect of biochar aging on contaminants content and ecotoxicological properties of biochar



Jesteś zainteresowany jednym
(lub więcej) zagadnieniem

???

Zapraszamy do wykonywania pracy
licencjackiej lub magisterskiej w ZChŚ