

Kruševac, Srbija
30. maj - 1. jun 2018

8. SIMPOZIJUM

Hemija i zaštita životne sredine

sa međunarodnim učešćem

ENVIROCHEM 2018

8th SYMPOSIUM

Chemistry and Environmental Protection

with international participation

Knjiga izvoda

BOOK OF ABSTRACTS



Srpsko hemijsko društvo
Serbian Chemical Society



Sekcija za hemiju i zaštitu životne sredine
Environmental Chemistry Division

**8. Simpozijum
Hemija i zaštita životne sredine**

sa međunarodnim učešćem

***8th Symposium
Chemistry and Environmental Protection***

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**KNJIGA IZVODA
BOOK OF ABSTRACTS**

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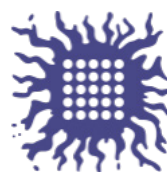
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nauke Vinča



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PROGRAM / PROGRAMME

UTORAK / TUESDAY 29.05.2018.

17:30	PRIJAVLJIVANJE/ REGISTRATION
18:30 - 20:00	Zajednički koktel / Get together cocktail

SREDA / WEDNESDAY 30.05.2018.

08:30	PRIJAVLJIVANJE/ REGISTRATION
9:30 – 10:00	SVEČANO OTVARANJE SIMPOZIJUMA / OPENING CEREMONY Predsedavajući / Chairpersons: <i>Bojan Radak, Jelena Savović, Ivan Gržetić</i>
10:00 - 10:45	PLENARNO PREDAVANJE / PLENARY LECTURE (Predsedavajući / Chairperson: Ivan Gržetić) <i>Biodegradacija nafte u sedimentnim stenama i u životnoj sredini – prednosti i nedostaci</i> Branimir Jovančićević
10:45	SEKCIJA 1 / SESSION 1 Predsedavajući / Chairpersons: <i>Ivan Gržetić</i>
10:45 – 11:15	PREDAVANJE PO POZIVU / INVITED LECTURE 1 <i>Actuality and Perspectives of the Application of Electrochemical Methods in Environmental Analysis</i> Ljubiša Ignjatović
	USMENA IZLAGANJA / ORAL PRESENTATIONS
11:15- 11:30	<i>Ekološko pravna zaštita od negativnih tehnogenih uticaja</i> Vladan Joldžić
11:30- 11:45	ANALYSIS obraćanje
11:45-11:55	LECO obraćanje
11:55-12:15	Pauza za kafu / Coffee break

12:15-13:00	<p>PLENARNO PREDAVANJE / PLENARY LECTURE (Predsedavajući / Chairperson: <i>Jelena Savović</i>) <i>Biosorption: Can we address water quality and contribute to the 'circular economy'?</i> Stuart Gibb</p>
13:00-14:00	Pauza za ručak / Lunch break
14:00-15:30	<p>Poster sekcija 1 / Studentska sekcija (PP1/1-32, PPS/1-8) (Predsedavajući / Chairperson: <i>Miloš Momčilović, Sanja Živković, Tijana Milićević</i>)</p>
15:30	Izlet Jastrebac

ČETVRTAK / THURSDAY 31.05.2018.

08:30	PRIJAVLJIVANJE/ REGISTRATION
9:00 – 9:45	<p>PLENARNO PREDAVANJE / PLENARY LECTURE (Predsedavajući / Chairperson: <i>Vladimir Beškoski</i>) <i>Peroxo-methods for the synthesis of mixed metaloxide materials</i> Viacheslav Avdin, Igor Krivtsov, Marina Ilkaeva</p>
9:45	<p>SEKCIJA 2 / SESSION 2 Predsedavajući / Chairpersons: <i>Vladimir Beškoski</i></p>
9:45 – 10:15	<p>PREDAVANJE PO POZIVU / INVITED LECTURE 2 <i>Zelena sinteza metalnih nanočestica korišćenjem ekstrakata biljaka - nove primene biljnih resursa</i> Vladimir Mihailović</p>
	USMENA IZLAGANJA / ORAL PRESENTATIONS
10:15- 10:30	<p><i>Photochemical degradation of textile dye C.I. Reactive Blue 19 in a continuous photoreactor by means of sulfate radicals</i> Nena Velinov</p>
10:30- 10:45	<p><i>Elektrohemijska dekolorizacija reaktivnih tekstilnih boja primenom ugljeničnih elektroda visoke poroznosti, dobijenih iz fenol-formaldehidnih smola</i> Dragan Manojlović</p>
10:45-11:15	Pauza za kafu / Coffee break

11:15 -12:00	PLENARNO PREDAVANJE / PLENARY LECTURE (Predsedavajući / Chairperson: <i>Ilija Brčeski</i>) <i>Primena dielektričnog barijernog pražnjenja u tretmanu voda</i> Goran Roglić
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12:30- 12:45	<i>Enhanced phosphorus removal from water by KOH modified crab carapace, oyster and mussel shell</i> Sabolc Pap
12:45 - 13:00	<i>The chemical composition of volatile autolysis products of a potential phytoremediation plant species <i>Bornmuellera dieckii</i> Degen (Brassicaceae)</i> Milica Todorovska
13:00 -14:30	Pauza za ručak / Lunch break
14:30-15:00	ZELENA HEMIJA: Perspektive i mogućnosti primene u Srbiji <i>Diskusioni panel</i> Vladimir Beškoski
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15:00-15:30	PREDAVANJE PO POZIVU / INVITED LECTURE 4 <i>Exploring new horizons and sustainable technologies for highly efficient wastewater remediation and decontamination: Multifunctional biochar</i> Maja Turk Sekulić
	USMENA IZLAGANJA / ORAL PRESENTATIONS
15:30 - 15:45	<i>Sorption-desorption hysteresis of atrazine onto organoclays</i> Anita Leovac Maćerak
15:45 - 16:00	Pauza za kafu / Coffee break

16:00-17:30	Poster sekcija 2 (PP2/1-40) (Predsedavajući / Chairperson: <i>Miloš Momčilović, Sanja Živković, Tijana Milićević</i>)
20:30	SVEČANA VEČERA / GALA DINNER Restoran Bagdala

PETAK / FRIDAY 01.06.2018.

9:00	SEKCIJA 5 / SESSION 5 Predsedavajući / Chairpersons: <i>Tatjana Šolević-Knudsen, Aleksandra Šajnović</i>
9:00 – 9:30	PREDAVANJE PO POZIVU / INVITED LECTURE 5 <i>Towards widespread adoption of low cost air quality sensors - a necessity for effective calibration procedures</i> Miloš Davidović
	USMENA IZLAGANJA / ORAL PRESENTATIONS
9:30- 9:45	<i>Fotokatalitička degradacija ibuprofena u akvatičnom matriksu primenom nanokatalitičke smeše ZnO/TiO₂</i> Mirjana Vojinović Miloradov
9:45-10:00	<i>Određivanje fipronila i njegovih metabolita u pilećim jajima i proizvodima od jaja korišćenjem gasne hromatografije-masene spektrometrije</i> Aleksandra Tasić
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	USMENA IZLAGANJA / ORAL PRESENTATIONS
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11:15 - 11:30	<i>Assessment of potentially toxic elements bioavailability in the soil-plant-air system in different vineyard ambients in Serbia: biomonitoring, environmental and health risk implications</i> Tijana Milićević
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12:00- 12:15	<i>Primeri uticaja različitih strategija upravljanja otpadom na emisije gasova sa efektom staklene bašte u Republici Srbiji</i> Marina Mihajlović
12:15- 12:30	<i>Ispitivanje potencijala celuloze kao univerzalnog matriksa za analizu metala u biljkama pomoću WD-XRF</i> Jovana Orlić
12:30-12:45	<i>The influence of seawater physicochemical parameters on the content of trace elements in mussels and surface sediment</i> Milica Ivković
	ZATVARANJE SIMPOZIJUMA/ CLOSING CEREMONY

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Branimir Jovančićević

PL-2 Biosorption: Can we address water quality and contribute to the ‘circular economy’?

Stuart Gibb

PL-3 Peroxo-methods for the synthesis of mixed metaloxide materials

Viacheslav Avdin

PL-4 Primena dielektričnog barijernog pražnjenja u tretmanu voda

Goran Roglić

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Ljubiša Ignjatović

IL-2 Zelena sinteza metalnih nanočestica korišćenjem ekstrakata biljaka - nove primene biljnih resursa

Vladimir Mihailović

IL-3 Challenges hindering the effective removal of arsenic from drinking water

Malcolm Watson

IL-4 Exploring new horizons and sustainable technologies for highly efficient wastewater remediation and decontamination: Multifunctional biochar

Maja Turk Sekulić

IL-5 Towards widespread adoption of low cost air quality sensors - a necessity for effective calibration procedures

Miloš Davidović

IL-6 Today’s cheap coal-derived electricity means future costly environmental pollution

Gordana Medunić

IL-7 How green is biocatalysis?

Jasmina Nikodinovic-Runić

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Vladan Joldžić

OP-2 Photochemical degradation of textile dye C.I. Reactive Blue 19 in a continuous photoreactor by means of sulfate radicals
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OP-3 Elektrohemijska dekolozacija reaktivnih tekstilnih boja primenom ugljeničnih elektroda visoke poroznosti, dobijenih iz fenol-formaldehidnih smola
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OP-4 Enhanced phosphorus removal from water by KOH modified crab carapace, oyster and mussel shell
Sabolc Pap, Lisa Shearer, Mark A. Taggart, Barbara Bremner, Stuart Gibb

OP-5 The chemical composition of volatile autolysis products of a potential phytoremediation plant species Bornmuellera dieckii Degen (Brassicaceae)
Milica Todorovska, Niko Radulović

OP-6 Sorption-desorption hysteresis of atrazine onto organoclays
Anita Leovac Maćerak, Ivana Ivančev-Tumbas, Đurđa Kerkez, Božo Dalmacija

OP-7 Fotokatalitička degradacija ibuprofena u akvatičnom matriksu primenom nanokatalitičke smeše ZnO/TiO₂
Mirjana Vojinović Miloradov, Mladěnka Novaković, Ivana Mihajlović, Goran Štrbac, Maja Petrović, Dragana Štrbac

OP-8 Trace element contamination (Pb, Zn, Cd, As, Ni) of floodplain sediments in a former ore mining area in Eastern Belgium
Dubravka Relić, Dragana Milanović, Theodoros Potouridis, Wilhelm Püttmann

OP-9 Određivanje fipronila i njegovih metabolita u pilećim jajima i proizvodima od jaja korišćenjem gasne hromatografije-masene spektrometrije
Aleksandra Tasić, Ksenija Nesić, Ljubiša Ignjatović, Nebojša Vuković

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OP-11 Assessment of potentially toxic elements bioavailability in the soil-plant-air system in different vineyard ambients in Serbia: biomonitoring, environmental and health risk implications

Tijana Milićević, Mira Aničić Urošević, Dubravka Relić, Sandra Škrivanj, Gordana Vuković, Aleksandar Popović

OP-12 Ispitivanje potencijala celuloze kao univerzalnog matriksa za analizu metala u biljkama pomoću WD-XRF

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OP-13 The influence of seawater physicochemical parameters on the content of trace elements in mussels and surface sediment

Slavka Stanković, Ana Perosević, Nikola Petrović, Milica Ivković, Marija Kojić, Milena Radomirović, Antonije Onjia

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Jelena Senčanski, Maja Pagnacco, Stevan Blagojević, Milica Vujković

PP1/4 Oscillatory Reaction as a Tool to Determine Purpurin Concentration

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PP1/6 Karbon kriogel kao adsorbent za uklanjanje Cd(II), Zn(II) i Ni(II) jona iz vode

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PP1/7 PAH diagnostic ratio and source analysis in the vicinity of industry sampling sites

Anka Cvetković, Milena Jovašević Stojanović, Dušanka Matijević, Stamenko Dikanović, Nebojša Vuković

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PP1/21 Adsorption potential of hydrochars obtained from sugar beet pulp towardalachlor

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PP1/22 Komparacija efikasnosti metode fitoremedijacije procednih voda deponije primenom Eichhornia crassipes

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Towards widespread adoption of low cost air quality sensors - a necessity for effective calibration procedures

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One of the most important factors for increasing usefulness and relevance of air pollution data on a personal level would certainly be an increase in its spatial resolution. Current state of affairs in air quality monitoring networks at state or local level is such that they typically provide a wealth of high resolution temporal data, but monitoring stations are on the other hand mainly located at a few strategically important places in urban area. This low spatial resolution is a big barrier towards providing personally relevant information to citizens which would then be able to answer questions such as: what is the level of air pollution on routes and places they frequent, what are the associated health risks, and finally what can they do about it and at what cost? Part of the solution to this complex puzzle may be in low-cost air quality sensors (LCS).

LCS's are an emerging technology and are now commercially available for gases, particulate matter and meteorological parameters in a wide variety of designs and capabilities. However, the data sets generated by devices composed of selected LCS are often of questionable data quality. There are some protocols for calibration LCS in laboratory and in the field, but such procedures are extensive and appropriate for testing performance only during sensor development, but are certainly not practically feasible for testing of each commercial LCS [1, 2]. Developing, optimizing, and refining experiments and statistical modelling techniques for LCS-AQ calibration and validation is the mandatory step on the route of obtaining reliable and meaningful data [3, 4]. This work elaborates an important part of LCS deployment – its effective calibration procedure. We will describe our current work on calibration procedures for sensors for gaseous pollutants: ozone and carbon monoxide and sensors for particulate matter. In validation campaigns described in this work we have used combination of quality checks and mid-level validation, together with several statistical modeling approaches in order to observe which sensors have desirable level of performance and to later derive calibration curves or more complex calibration models. Calibration models were based on simple linear regression (LR), multiple linear regression (MLR) and artificial neural networks (ANN).

Mid-level validation of particulate matter low cost sensors was done via collocation with lab-grade instruments in laboratory office space in Institute Vinca and the results were collected for several weeks. Low cost instruments included two Sharp GP2Y1010AU0F compact optical dust sensors connected to Arduino platform (1 channel output), Alphasense CompactOPC sensor (16 channels from 0.38 to 17 μm) and Dylos DC1700 PM unit (2 channels corresponding to “large” and “small” particles). Lab grade instruments included

TSI NanoScan SMPS Model 3910 and TSI Optical particle sizer 3330 (17 channels from 0.3 μ m to 10 μ m). Basic quality check of two Sharp sensors showed that they did not have malfunctions and are surprisingly reliable when used in combination with Arduino platform. Sharp sensors mutually correlate with correlation coefficient $cc \sim 0.98$. In comparison with lab grade instruments, they correlate best with OPS first channel $cc \sim 0.75$ and cc steadily declines for channels corresponding to larger particles. Dylos channels best correlate with OPS 0.5-0.721 μ m for “small” particles with $cc \sim 0.60$, and with OPS 2.156 μ m for “large” particles with $cc \sim 0.978$. Best performing low cost sensor was certainly Alphasense OPC with cc over 0.90 for corresponding channels. Performed validation steps clearly show to which particulate matter size range individual sensor channels correspond, enabling one to derive meaningful calibration curves.

LCS's for gaseous pollutants were deployed within multi-sensor platform AQMesh. Platforms were collocated with Automatic Monitoring Station Stari Grad belonging to the State Network run by the Serbian Environmental Protection Agency (SEPA), in two 1-month periods in late summer and early autumn 2015. CO and O₃ sensors in AQMesh platform passed low level validation (criteria was percentage of collected data), and were considered for development of calibration models. Choice of predictors for MLR and ANN models utilized both statistical reasoning and heuristics to avoid overfitting calibrated sensor with co-varying gas species. Improvements in sensor performance with sophisticated ANN models compared to LR were significant, resulting in relative residuals less than 15% for concentration of pollutant approximately ranging from 175 μ g/m³ to 400 μ g/m³, while for O₃ in the range from 40 μ g/m³ to 120 μ g/m³.

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