

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

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**KNJIGA IZVODA
BOOK OF ABSTRACTS**

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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	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
13:00-14:00	Pauza za ručak / Lunch break
14:00-15:30	Poster sekcija 1 / Studentska sekcija (PP1/1-32, PPS/1-8) (Predsedavajući / Chairperson: <i>Miloš Momčilović, Sanja Živković, Tijana Milićević</i>)
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ČETVRTAK / THURSDAY 31.05.2018.

08:30	PRIJAVLJIVANJE/ REGISTRATION
9:00 – 9:45	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
9:45	SEKCIJA 2 / SESSION 2 Predsedavajući / Chairpersons: <i>Vladimir Beškoski</i>
9:45 – 10:15	PREDAVANJE PO POZIVU / INVITED LECTURE 2 <i>Zelena sinteza metalnih nanočestica korišćenjem ekstrakata biljaka - nove primene biljnih resursa</i> Vladimir Mihailović
	USMENA IZLAGANJA / ORAL PRESENTATIONS
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10:30- 10:45	<i>Elektrohemijska dekolorizacija reaktivnih tekstilnih boja primenom ugljeničnih elektroda visoke poroznosti, dobijenih iz fenol-formaldehidnih smola</i> Dragan Manojlović
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
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16:00-17:30	Poster sekcija 2 (PP2/1-40) (Predsedavajući / Chairperson: <i>Miloš Momčilović, Sanja Živković, Tijana Milićević</i>)
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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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12:15- 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 Jovančičević

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
Jelena Mitrović, Miljana Radović, Slobodan Najdanović, Nena Velinov, Danijela Bojić, Aleksandar Bojić

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
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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
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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
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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

Jovana Orlić, Marija Krstić, Teodora Krsmanović, Konstantin Ilijević, Ivan Gržetić

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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Nanostructured titanium-dioxide thin films for environmental applications

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Titanium-dioxide nanostructures and thin films are interesting for application in environmental protection, for water and air purification from toxic compounds, and photocatalytic degradation of water, where separation of H₂ is important for the development of new energy sources. Furthermore, they are interesting for fabrication of solar cells, various sensor applications, transparent conducting oxides (TCO), etc [1-3]. Stoichiometric TiO₂ phase has a wide optoelectronic band gap of ~3.2 eV, which makes it a dielectric at lower temperatures and a semiconductor at higher temperatures. It has a high absorption coefficient in the range of UV radiation, but low in the visible light region, and this makes significant constraints for its usage as a photocatalyst. For reducing energy gap, better absorption in visible light region and more efficient application it is necessary to add doping material species, which can be metal or non-metal ions. When used as a photocatalyst in form of a powder, TiO₂ nanoparticles are embedded in photosensitizing dyes which absorb visible light, or they are partly covered with nanoparticles of some transition metal to enhance injection of charge carriers. Recent developments involve the use of physical vapor deposition (vacuum evaporation or ion sputtering) to synthesize TiO₂ thin film structures, and ion implantation for their doping. The advantage of using physical vapor deposition is that the Ti:O ratio can be varied, and the films can be deposited on any supporting or large area substrates. On the other hand, ion implantation is a proven technique for introducing dopant atomic species into the crystal lattice of semiconductor materials.

In these experiments TiO₂ thin films were synthesized by physical vapor deposition (PVD) method, using three different procedures: (i) reactive d.c. ion sputtering of pure Ti target, using Ar ions and introducing O₂ in the deposition chamber; (ii) r.f. sputtering of TiO₂ target, using Ar + O₂ gas mixture; and (iii) reactive e-beam evaporation of pure Ti in the presence of introduced O₂. In case of reactive d.c. ion sputtering additional experiments involved a controlled introduction of nitrogen in the interaction chamber, which yielded doping of the deposited TiO₂ thin films, in reducing their band gap and enhancing absorption of visible light. The films were deposited to a thickness of a few hundred nm on silicon wafers and glass slide substrates. Structural and compositional characterization of samples included X-ray diffraction analysis (XRD), transmission electron microscopy (TEM, HRTEM), Rutherford backscattering spectrometry (RBS), and X-ray photoelectron spectroscopy (XPS). Optical characterizations were done by measuring the transmission and diffuse reflection UV/VIS spectra. Photocatalytic activity was measured by determining the photodegradation rate of organic solutions.

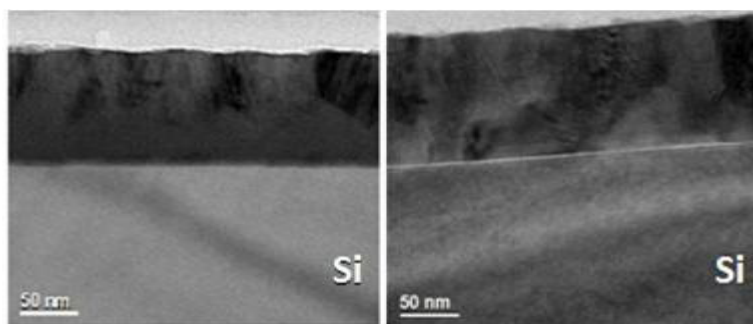


Fig. 1. Bright-field TEM cross-sectional images of two different samples, showing the fine polycrystalline nature of TiO_2 films deposited on Si wafers.

Structural characterization revealed that as-deposited samples grow in form of a mixture of very fine nanocrystalline grains of rutile and anatase TiO_2 phases and TiO . Hence, in order to homogenize the TiO_2 stoichiometry and induce the growth of larger grains it was necessary to anneal the samples in air, at temperatures of 400 and 600 °C [4]. This procedure was performed on all samples after deposition. Bright-field cross-sectional images taken from two different TiO_2 films deposited on Si wafers are shown in Fig. 1. Sharp contrast regions within the films indicate their polycrystalline structure. The results of investigations showed that it is possible to tailor the structure and properties of the obtained TiO_2 thin films by adjusting the processing parameters.

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