

Stabilitätspakt für Südosteuropa Gefördert durch Deutschland Stability Pact for South Eastern Europe Sponsored by Germany

Workshop "From Molecules to Functionalized Materials" Module "Optical and Electronic devices" 1-5 September 2016 Ohrid, Republic of Macedonia

## INTERNATIONAL MASTER AND POSTGRADUATE PROGRAMME IN MATERIALS SCIENCE AND CATALYSIS

## **MatCatNet**

Workshop

*"From Molecules to Functionalized Materials" Scientific Module "Optical and Electronic Devices"* 

## **PROGRAMME AND ABSTRACT BOOK**

1-5-September 2016. Ohrid, Macedonia

## P R O G R A M M E

## MatCatNet Workshop "From Molecules to Functionalised Materials" and Scientific module "Optical and Electronic Devices" <u>1-5 September 2016 Ohrid, Macedonia</u>

#### Thursday, 1 September 2016

09:00-09:50	Registration
09:50-10:00	Prof. Dr. Evamarie Hey-Hawkins and Prof. Dr. Slobotka Aleksovska <i>Welcoming address</i>

## Scientific module "Optical and Electronic Devices" -Lectures-

10:00-11:00	Prof. D	r. Murie	el Hiss	ler (R	ennes,	France)	
DEVICES	$\pi$ -CONJU	GATED P	OLYME	K2 FOR	(0010)	ELECIKUI	NIC
11:00-11:30	Coffee b	reak					
11:30-12:30	Prof. D	r <b>. Mur</b> ie	el Hiss	ler (R	ennes,	France)	
DEVICES	π-CONJU	GATED	POLY	MERS	FOR	(OPTO)E	LECTRONIC
12:30-14:00	Lunch						
14:00-14:45	<b>Assoc.</b> Roman PRECURS	<b>Prof.</b> ia) SORS FOF	<b>Dr.</b> R OPTIC	<b>Luiza</b> AL MAT	<b>Gain</b> Gerials	1 <b>a (Clu</b> AND DEV	<b>ij-Napoca,</b> ICES
14:45-15:30 Macedonia)	Prof.	Dr.	Slobo	otka	Aleks	ovska	(Skopje,
	ORGANIO MATERIA	C-INORGA ALS FOR S	ANIC PE Solar (	ROVSK CELLS	ITES AS	PROSPECT	ſIVE
15:30-16:00	Coffee b	reak					

16:00-16:45	Prof. Dr. Metodija Najdoski (Skopje, Macedonia)
	ELECTROCHROMISM AND ELECTROCHROMIC DEVICES

## <u>Friday, 2 September 2016</u>

09:00-09:45	Prof. Dr. Fetah Podvorica (Prishtina, Kosovo)
	GRAFTING OF ORGANIC FILMS FOR MOLECULAR ELECTRONIC JUNCTIONS
09:45-10:30	Prof. Dr. Rubin Gulaboski (Štip, Macedonia)
	ELECTROCHEMICAL DEVICES - PRINCIPLES AND APPLICATION
10:30-11:00	Coffee break
11:00-11:45	Ass. Prof. Dr. Marjan Randjelović (Niš, Serbia)
	COLOR(ED) CENTERS AND RELATED DEFECTS IN CRYSTALLINE MATERIALS FOR OPTO-ELECTRONIC (FUNCTIONALIZED) DEVICES
11:45-12:30	Dr. Radomir Ljupkovic (Niš, Serbia)
	HRTEM AND FESEM IN CHARACTERIZATION OF SELECTED MODERN MATERIALS – PART 1
12:30-14:00	Lunch
14:00-14:45	Dr. Radomir Ljupkovic (Niš, Serbia)
	HRTEM AND FESEM IN CHARACTERIZATION OF SELECTED MODERN MATERIALS – PART 2
Minisym	posium "Advanced Methods in Chemistry"
14:45-15:15	Ass. Prof. Dr. Biljana Balabanova (Štip, Macedonia)
	OPTICAL EMISSION SPECTROSCOPY: A METHOD FOR CORRELATING EMISSION INTENSITIES TO "REACTIVE PARTICLE DENSITY"

15:15-15:45 Assoc. Prof. Dr. Violeta Ivanova Petropulos (Štip, Macedonia

BASIC PRINCIPLES OF HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

**15:45-16:15** *Coffee break* 

**16:30-** Sightseeing of Ohrid

#### <u>Saturday, 3 September 2016</u>

## MatCatNet Workshop "From Molecules to Functionalised Materials"

## -Oral presentations-

Session 1 (Chair: Leon Stojanov)

- **09:00-09:40** Muriel Hissler – invited speaker (Rennes, France) P-CONTAINING POLYCYCLIC AROMATIC HYDROCARBONS: COORDINATION CHEMISTRY AND OPTO-ELECTRONIC APPLICATIONS
- **09:40-10:00** *Coffee break*
- 10:00-10:15 Éva Andrea Molnár

(Faculty of Chemistry and Chemical Engineering, Babes-Bolyai University, Cluj-Napoca, Romania)

ARYL- AND  $\beta\mbox{-}FORMYLATION$  OF NEW PHENOTHIAZINYL-PORPHYRINS

#### 10:15-10:30 Arijanit A. Reka

(Faculty of Natural Science and Mathematics, University in Tetovo, Macedonia)

PHASE TRANSOFRMATIONS OF SILICON DIOXIDE IN DIATOMACEOUS EARTH AT TEMPERATURE RANGE 1000 – 1200 °C

- 10:30-10:45 John Popp (Faculty of Chemistry and Mineralogy, Leipzig University, Germany) DENDRITIC FERROCENYL PHOSPHINES FOR REDOX-SWITCHABLE CATALYSIS
- 10:45-11:00Dijana Atanasova<br/>(Faculty of Medical Sciences, University Goce Delcev– Štip,<br/>Macedonia)OPTIMIZATION AND VERIFICATION OF THE METHOD FOR<br/>DETERMINATION OF ANTIOXIDANT ENZYME CATALASE IN VITRO

#### Session 2 (Chair: Marija Sterjova)

#### 11:00-11:15 Jeton Halili

(University of Prishtina, Department of Chemistry, Prishtina, Kosovo)

<u>GC-FID OPTIMIZATION AND VALIDATION FOR SIMULTANEOUS</u> <u>DETERMINATION</u> OF HEROIN IN REAL SAMPLES **11:15-11:30Noémi Deak**<br/>(Faculty of Chemistry and Chemical Engineering, Babes-Bolyai<br/>University, Cluj-Napoca, Romania)NEW SULFUR-BASED PINCER TYPE LIGANDS:

NEW SULFUR-BASED PINCER TYPE LIGANDS FROM DESIGN TO APPLICATIONS

**11:30-11:45** *Coffee break* 

#### 11:45-12:00 Kaltrina Jusufi

(University of Prishtina, Department of Chemistry, Prishtina, Kosovo)

DETERMINATION OF HEAVY METALS IN CABBAGE SAMPLES FROM THE AREA SURROUNDING KOSOVO'S POWER PLANTS

#### 12:00-12:15 Antonio Buzharevski (Faculty of Chemistry and Mineralogy, Leipzig University, Germany) CARBORANYL ANALOGUES OF NONSTEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDs)

#### Session 3 (Chair: Patricia Miclea)

#### 12:15-12:30 Miranda Misini

(University of Prishtina, Department of Chemistry, Prishtina, Kosovo)

DETERMINATION OF ANTIOXIDANTS WITH ELECTROCHEMICAL BIOSENSORS BASED ON BORON DOPED DIAMOND ELECTRODES AND CARBON PASTE ELECTRODES

#### 12:30-12:45 Viktorija Maksimova

(Faculty of Medical Sciences, University Goce Delcev– Štip, Macedonia)

COMPARISON OF OPTICAL AND ELECTROCHEMICAL METHODS FOR DETERMINATION OF THE ANTIOXIDANT EFFECT OF SOME PLANT METABOLITES

#### 12:45-13:00 Hamdije Memeti

(Faculty of Natural Science and Mathematics, University in Tetovo, Macedonia)

DETERMINATION OF ADSORPTION CHARACTERISTICS OF NATURAL INORGANIC SORBENTS FOR REMOVAL OF Cr(VI) IONS FROM WATER RESOURCES

#### 13:00-13:15 Aleksandra Krsti<u>ć</u>

(Faculty of Science and Mathematics, University of Niš, Niš, Serbia)

CYCLIC VOLTAMMETRY USING MODIFIED CARBONPASTE ELECTRODES FOR ELECTRO-CATALYTIC ACTIVITY STUDY OF DOPED CARBON MICROSPHERES: POTENTIAL APPPLICATION FOR ELECTRO-CATALYTIC SENSING

13:15-14:30	Lunch
14:30	Boat trip to St. Naum

#### Sunday, 4 September 2016

## -Oral presentations-

#### Session 4 (Chair: Arijanid Reka)

#### 09:00-09:15 **Ionut-Tudor Moraru** (Faculty of Chemistry and Chemical Engineering, Babes-Bolyai University, Cluj-Napoca, Romania) UNDERSTANDING THE STRUCTURE OF SILOXANIC, GERMOXANIC AND STANNOXANIC SPECIES 09:15-09:30 **Leon Stojanov** (Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia) PREPARATION OF SILVER NANOPARTICLES USING ASCORBIC ACID AND GLUTHATHIONE AS REDUCTIVE REDOX AGENTS 09:30-09:45 **Taulant Demelezi** (University of Prishtina, Department of Chemistry, Prishtina, Kosovo) THE EVALUATION OF THE CARBON DIOXIDE SUPERCRITICAL EXTRACTION PERFORMANCE OF VITAMIN C FROM LEMON FRUIT BY THE USE OF ELECTROCHEMICAL METHODS 09:45-10:00 Sasho Stojkovikj (Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia) DESIGN OF AMPEROMETRIC SENSORS FOR H<sub>2</sub>O<sub>2</sub> BASED ON K<sub>0.27</sub>MnO<sub>2</sub>·x H<sub>2</sub>O THIN FILMS 10:00-10:15 Patricia Miclea (Faculty of Chemistry and Chemical Engineering, Babes-Bolyai University, Cluj-Napoca, Romania) ALTERNATIVE PATHS FOR CONTROLLING THE OXIDATION STATE OF CLASS 2 HEMOGLOBIN FROM ARABIDOPSIS THALIANA

#### Session 5 (Chair: John Popp)

#### 10:15-10:30 Ana Koceva

(Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia)

POSSIBILITIES FOR CHEMICAL MODIFICATION AND ANALYSIS WITH INFRARED AND RAMAN SPECTROSCOPY OF GROUND SILICATE GLASS

**10:30-10:45** Angela Trajkovska (Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia)

IR AND RAMAN SPECTROSCOPIC ANALYSIS OF CHEMICALY MODIFIED FLAT SILICATE GLASS

#### 10:45-11:00 Stefan Jovanov

(Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia)

TEMPERATURE-DEPENDENT PROPERTIES OF LIQUID WATER FROM A COMBINED STATISTICAL MECHANICS – NETWORK SCIENCE PERSPECTIVE

#### 11:00-11:15 Daniela Gjorgjevikj

(Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia)

EVALUATION OF THE ELECTROCHEMICAL ACTIVITY OF ASCORBIC ACID AND THE SYNERGY WITH GLUTATHIONE IN DIFFERENT PH ENVIRONMENT

**11:15-11:45** *Coffee break* 

## - Poster flash presentations -

#### Session 6 (Chair: Aleksandra Krsti<u>ć</u>)

**11:45-11:50 Marija Sterjova** (Faculty of Medical Sciences, University Goce Delcev–Štip, Macedonia)

POSSIBILITIES FOR FORMULATION OF TRASTUZUMAB -RADIOIMMUNOGONJUGATES

**11:50-11:55 Elena Drakalska** (Faculty of Medical Sciences, University Goce Delcev– Štip, Macedonia)

CURCUMIN LOADED HYBRID pH-SENSITIVE LIPOSOMES-PREPARATION AND CHARACTERIZATION

# **11:55-12:00Alexandra-Krisztina Simon**<br/>(Faculty of Chemistry and Chemical Engineering, Babes-Bolyai<br/>University, Cluj-Napoca, Romania)SPIN-LABELED BLOOD SUBSTITUTE CANDIDATES: IN VITRO AND<br/>IN VIVO EVALUATION

12:00-12:05 Marija Atanasova (Faculty of Medical Sciences, University Goce Delcev– Štip, Macedonia) VOLATILE COMPOSITION, ANTIOXIDANT AND ANTIMICROBIAL

ACTIVITY OF ESSENTIAL OIL FROM *MENTHA ARVENSIS* L. ORGANICALLY PLANTED FROM MACEDONIA

# 12:05-12:10Bojan Bogatinovski<br/>(Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril<br/>and Methodius, Skopje, Macedonia)DEHALOGENATION OF HEXACHLOROCYCLOHEXANES USING<br/>ZINC DUST

**12:10–14:00** Lunch

#### Session 7 (Chair: Kaltrina Jusufi)

14:00-14:05 Dragana Trajkovikj

(Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia)

SIMULTANEOUS DETERMINATION OF ACTIVE COMPONENTS IN VETERINARY DRUGS USING UV SPECTROSCOPY AND CHEMOMETRICS

#### 14:05-14:10 Kire Stojanovski

(Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia)

 $SYNTHESIS \ AND \ CRYSTALSTRUCTURE \ DETERMINATION \ OF \\ SmCo_{0.5}Cr_{0.5}O_3 \ AND \ Sm_{0.8}Ca_{0.2}Co_{0.5}Cr_{0.5}O_{3-\delta} \ PEROVSKITES$ 

#### 14:10-14:15 Elena Cvetkovska

(Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia)

ESTIMATION OF MEASUREMENT UNCERTAINTY FOR ENROFLOXACIN DETERMINATION IN VETERINARY MEDICINAL PRODUCTS BY TWO SPECTROPHOTOMETRIC METHODS

#### 14:15-14:20 Besart Shatri

(University of Prishtina, Department of Chemistry, Prishtina, Kosovo)

SYNTHESIS, CHARACTERIZATION AND THE USE OF SUBSTITUTED ARYLDIAZONIUM SALTS FOR THE MODIFICATION OF THE ACTIVATED CARBON POWDER

#### 14:20-14:25 Elisaveta Nikoloska

(Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia)

INFLUENCE OF SILVER SUBSTITUTION ON ELECTROCATALYTIC

#### Session 8 (Chair: Noemi Deak)

## 14:25-14:30 Alexandra Bogdan (Faculty of Chemistry and Chemical Engineering, Babes-Bolyai University, Cluj-Napoca, Romania) 1,3-DIOXANE DERIVATIVES AS INTERMEDIATES FOR CHEMICALLY AND PHOTOCHEMICALLY ACTIVATED MOLECULAR DEVICES 14:30-14:35 Fjolla Hashani

(University of Prishtina, Department of Chemistry, Prishtina, Kosovo)

THE ROLE OF SURFACTANTS (TRITON X-100 AND SODIUM DODECYLBENZENESULFONATE) ON THE ELECTROCHEMICAL DETERMINATION OF ASCORBIC ACID

#### 14:35-14:40 Sara Gligoroska

(Faculty of Natural Sciences and Mathematics, Unversity Ss Cyril and Methodius, Skopje, Macedonia)

SYNTHESIS AND IDENTIFICATION OF SOME GUANIDINIUM ORGANIC-INORGANIC PEROVSKITES

#### 14:40-14:45 Ilirijana Osmani

(University of Prishtina, Department of Chemistry, Prishtina, Kosovo) THE ELECTROCHEMICAL MONITORING OF "EX SITU" EXTRACTED VITAMIN C

## 14:45-14:50 Gjani Hulaj

(University of Prishtina, Department of Chemistry, Prishtina, Kosovo)

THE USE OF THE GRAFTED ACTIVATED CARBON POWDERS FOR THE ADSORPTION OF THE LINDANE PESTICIDE FROM MODEL SYSTEMS

- **14:50–16:30** *Poster session / Coffee break*
- **20:00** Gala dinner

## <u>Monday, 5 September 2016</u>

## AN OVERVIEW OF THE MatCatNet PROJECT

09:30-10:00	<b>Prof. Dr. Evamarie Hey-Hawkins (project leader, Germany)</b> An overview of the project: achievements and perspectives
10:00-10:30	<b>Prof. Dr. Luminita Silaghi-Dumitrescu</b> An Overview of the project – Romanian perspective
10:30-10:45	<b>Prof. Dr. Slobotka Aleksovska</b> Personal experiences
10:45-11:15	Coffee break
11:00-11:30	Award ceremony
11:30-12:30	<b>Roundtable discussion-</b> Moderator: Prof. Evamarie Hey-Hawkins (project leader)
12:30-14:30	Lunch
14:30-15:30	Project coordinators meeting
15:30-16:00	Closing remarks
17:00	Departure



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#### $\pi$ -conjugated polymers for (opto)electronic devices

## **Muriel Hissler**

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#### Muriel.hissler@univ-rennes1.fr

Over the last twenty years  $\pi$ -conjugated oligomers and polymers have received increasing interest owing to their versatile functions that are demanded for breakthroughs in many interdisciplinary fields like bio-imaging or plastic electronics. For the latter field, organic light emitting diodes (OLEDs) have spearheaded the entry of an entirely new class of semiconductors based on organic molecules into industrial applications. Other devices, such as organic field effect transistors and organic photovoltaic cells, have not yet reached the same marketability, thus motivating substantial research program by academic and industrial groups. The demand for new organic  $\pi$ -conjugated materials with improved electrical and optical properties for plastic electronic applications is still very important and necessitates extensive experimental molecular engineering and theoretical investigations of underlying structure-property relationships.

The first lecture will begin with an introduction the properties of pi-conjugated systems (p and n doping, modulation and estimation of the HOMO-LUMO gap, estimation of the HOMO and LUMO by different techniques). Then, the second lecture will provide a brief introduction on organic light-emitting diodes, solar cells and field effect transistors.

#### **References**:

- a) K.MüllenWegner, G. (eds.) *Electronic materials: the oligomer approach*. Wiley-VCH, Weinheim, **1998**. J.L. Bredas and S. R. Organic semiconductors (volume 1 and 2)
- b) J.Roncali, Chem Rev. 1997, 97, 173
- c) Y.J. Cheng, S.-H. Yang, C. S. Hsu Chem Rev. 2009, 109, 5868
- d) B. W. D'Andrade, S. R. Forrest, Adv. Mater. 2004, 16, 1585

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#### OPTIMIZATION AND VERIFICATION OF THE METHOD FOR DETERMINATION OF ANTIOXIDANT ENZYME CATALASE IN VITRO

Dijana Atanasova<sup>1</sup>, Marija Joseva<sup>1</sup>, Zorica Arsova-Sarafinovska<sup>1, 2</sup> Email:dijana.15623@student.ugd.ed.mk

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<sup>2</sup>Institute of Public Health of the Republic of Macedonia, 50 Divizija 6, 1000 Skopje, .R. Macedonia

The human body constantly controls the presence of pro-oxidants and antioxidants. The balance between them is closely regulated and is very important for keeping the vital cell functions. The cell is permanently exposed to attacks from different external and internal forms on reactive oxygen species. <sup>1</sup>The hydrogen peroxide is a compound from the biosphere and it is one of the most common reactive oxygen species. On the other side, an antioxidant enzyme catalase is well studied because of its important function in cell protection from the potentially toxic effects of hydrogen peroxide.<sup>2</sup>Therefore, the aim of our study was to determine the activity of erythrocyte catalase in hemolysate using modified and optimized UV spectrophotometric method of Aebi (1984). The method monitors the rate of decomposition of the substrate - hydrogen peroxide  $(H_2O_2)$  at a wavelength of 240 nm. The method was optimized in order to achieve the optimal sample dilution and optimal time point for measuring the decrease in the absorbance due to the substrate decomposition. The data obtained showed that the sample should be diluted 1:1000 to achieve the activity of catalase in the range of 0.01 KU/ml - 0.04 KU/ml. As we obtained the best correlation factor when measuring the decomposition of hydrogen peroxide 30 s after the initiation of the reaction (R2 = 0.995), we chose to measure the change in absorbance in two time points, immediately and 30 s after addition of the substrate in the reaction mixture. The performance verification of the method was assessed through the determination of the parameters linearity and reproducibility. The results proved that the method is linear in the concentration range of 0.01 KU/ml - 0.04 KU/ml. The t-test showed that the method is reproducible (there is no statistically significant difference in the results obtained in two consecutive days of measurement, p = 0.1643). With this optimized method we determined the erythrocyte catalase activity in hemolysate of 23 healthy volunteers. The blood samples were collected in the Department of Occupational Medicine in the Institute of Public Health of R. Macedonia.

Key words: catalase, acatalasemia, hydrogen peroxide, method verification, method optimization

#### **References**:

[1] Giordano CR, Roberts R, Krentz KA, Bissig D, Talreja D, Kumar A, Terlecky SR, Berkowitz BA. Catalase therapy corrects oxidative stress-induced pathophysiology in incipient diabetic retinopathy. Invest Ophthalmol Vis Sci. 2015 May