

INSTITUTE OF TECHNICAL SCIENCES OF SASA
MATERIALS RESEARCH SOCIETY OF SERBIA

Programme and the Book of Abstracts

**TWENTIETH YOUNG RESEARCHERS' CONFERENCE
MATERIALS SCIENCE AND ENGINEERING**

Belgrade, November 30 – December 2, 2022



TWENTIETH YOUNG RESEARCHERS' CONFERENCE MATERIALS SCIENCE AND ENGINEERING

November 30 – December 2, 2022, Belgrade, Serbia

Programme and the Book of Abstracts

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&
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Aim of the Conference

Main aim of the conference is to enable young researchers (post-graduate, master or doctoral student, or a PhD holder younger than 35) working in the field of materials science and engineering, to meet their colleagues and exchange experiences about their research.

Topics

Biomaterials

Environmental science

Materials for high-technology applications

Materials for new generation solar cells

Nanostructured materials

New synthesis and processing methods

Theoretical modelling of materials

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Results of the Conference

Beside printed «Programme and the Book of Abstracts», which is disseminated to all conference participants, selected and awarded peer-reviewed papers will be published in journal “Tehnika – Novi Materijali”. The best presented papers, suggested by Session Chairpersons and selected by Awards Committee, will be proclaimed at the Closing Ceremony. Part of the award is free-of-charge conference fee at YUCOMAT 2023.

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3-1

**Bioactive hydroxyapatite/chitosan/poly(vinyl alcohol)/gentamicin composite coating
electrodeposited on titanium**

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Titanium (Ti) is an implant material widely used in orthopedics due to its high corrosion resistance (naturally forms a passive oxide layer) and good mechanical properties. Although Ti has certain ability to osseointegrate, the biocompatibility and bioactivity of Ti can be significantly improved by modifying its surface. In order to improve antibacterial properties a broad spectrum antibiotic gentamicin was loaded in a composite coating of hydroxyapatite (HAP) with natural polymers chitosan (CS) and poly(vinyl alcohol) (PVA) and was deposited on Ti using electrophoretic deposition (EPD) technique. EPD was carried out at the constant voltage on pure titanium plates from an aqueous suspension. Deposited HAP/CS/PVA and HAP/CS/PVA/Gent coating were characterized by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), and field emission scanning electron microscopy (FE-SEM). The obtained results confirmed the formation of new composite coatings. Cytotoxicity against two types of cell lines (MRC-5 and L929) was investigated using trypan blue dye-exclusion test (DET) and MTT assay for assessing cell metabolic activity. The antibiotic loaded coating (HAP/CS/PVA/Gent) exhibited good antibacterial activity against *Staphylococcus aureus* and *Escherichia coli*, while preserving low cytotoxicity, indicating the high potential for biomedical applications. Excellent osteogenic properties, through the promotion of osteoblast differentiation were confirmed by ALP assay. Results were much more pronounced for HAP/CS/PVA/Gent coating. Therefore, HAP/CS/PVA/Gent coating can be considered as an excellent promising candidate for biomedical hard tissue implants.

Abbas, Zahid	zahid.abbas@istec.cnr.it	18
Adamović, Vladimir		76
Ağaoğulları, Duygu		58, 62, 71
Aleksic, Vujadin		27
Aleksić, Katarina	katarina.aleksic@itn.sanu.ac.rs	39
Aleksić, Milena		81
Antal, I.		46
Antanasković, Anja	a.antanaskovic@itnms.ac.rs	76
Antosova, A.		46
Armaković, Stevan		21
Ayas, Erhan		71
Azeezulla Nazrulla, Mohammed		33
Bajac, Branimir		21, 40
Bajat, Jelena		59
Bajić, Danica		41, 61
Bajuk-Bogdanović, Danica		30
Balibrea-Correa, Javier		69
Banićević, Ivana	ivanaib100@gmail.com	8, 9, 10
Baščarević, Zvezdana		2
Bekaert, Jonas		42
Bele, Marjan		33, 38
Belec, Blaž		31, 36
Belojica, Tea	tbelojica@gmail.com	43
Bernauecker, C.		57, 66
Bigović, Dubravka		13, 14
Blagojević, Jovan	jovanb@ipb.ac.rs	42
Bobić, Zoran	zoran.bobic57@gmail.com	16, 29
Bognár, Szabolcs	sabolc.bognar@dh.uns.ac.rs	75, 77
Bogosavljević, Marica		41
Bonifacio, M.A		20
Bota, Sergiu-David	david.bota@umft.r	19
Božinović, Kristina		78, 86
Brzić, Saša		41

Bugarski, Branko		6
Bulatović, Srđan		27
Calogero Scalia, Alessandro	alessandro.scalia@uniupo.it	20
Chalyy, Dmytro		48
Chandra, Anil		3
Chebici, Sergiu		54,55
Chete, Sofia	sofia.chete@yahoo.com	19,56
Chiera, Nadine Mariel	nadine-mariel.chiera@psi.ch	69
Christa, Serban		56
Cîrligeriu, Laura Elena		19
Cochis, Andrea		10, 20
Colella, Francesco	francesco.coella.92@gmail.com	3
Cometa, S.		20
Craciunescu, Emanuela-Lidia		54,55
Csik, Attila		16
Cvjetićanin, Nikola		34
Cvjetinović, Đorđe	djorde.cvjetinovic@psi.ch	12,53
Ćujić, Danica		6
Ćujić Nikolić, Nada		13,14
Čapo, Ivan		16
Čekada, Miha		16
Čutović, Natalija	ncutovic@mocbilja.rs	6
Daković, Marko		82
Damjanović-Vasilić, Ljiljana		74
Danilov, Ivan		69
Dapčević, Aleksandra		47
Dapporto, Massimiliano		17,18
Davidović, Sladana		80
De Giglio, E.		20
De Vita, Alessandro		17
Del Mercato, Loretta		3

Dimitrijević-Branković, Suzana		80
Domingo-Pardo, Cesar		69
Drnovšek, Aljaž		29
Duma, Virgil-Florin		54,55,56
Dorđević, Branislav		26
Dorđević, Ivona	djordjevicivo3@gmail.com	25
Đošić, Marija		15
Đunović, Aleksandra	aleksandra.djunovic@gmail.com	23
Đurđić-Mijin, Sanja		42, 43, 63
Erčić, Jelena		30
Fidanovski, Bojana		61
Filipić, Brankica		14
Filipović, Nenad		5
Finčur, Nina		75,77
Finšgar, Matjaž		35
Forciniti, Stefania		3
Gaberšček, Miran		35,37
Gatalo, Matija		32, 35
Gavrilov, Nemanja		36
Gazova, Z.		46
Genorio, Boštjan		35
Gentile, P.		20
Gezović, Aleksandra		67
Gigli, Giuseppe		3
Gligorijević, Nikola		1
Gojgić, Jelena	jgojgic@tmf.bg.ac.rs	41, 57, 66
Gorgievski, Milan		78,86
Grekulović, Vesna		78,86
Grgur, Branimir		70
Grudić, Veselinka		67

Grujić, Bojana	bojana.grujic@aggf.unibl.org	79
Grujić, Žarko		79
Gržetić, Jelena D.	jrusmirovic@tmf.bg.ac.rs	41
Gürcan Bayrak, Kübra		71
Hodnik, Nejc		32, 33, 35, 37, 38
Hrnjić, Armin	armin.hrnjic@ki.si	32
Huseinović, Edina		86
Iafisco, Michele		17
Ilić, Nevena	nilic@tmf.bg.ac.rs	80
Ionut, Mihalcea		53
Iuele, Helena		3
Ivanovski, V. N.		63
Ivetić, Tamara		77
Jakovljević, Teodora	teodorajakovljevic2000@gmail.com	4
Janačković, Đorđe		73
Janković, Ana		15
Janković, Drina		12
Janković, Marija	marijam@vinca.rs	82, 85
Janković, Radmila		9
Jelić, Marko	marko.jelic@vinca.rs	30
Joksović, Sara		21
Jovanović, Primož		32,37,38
Jovanović, Aleksandra A.		6
Jovanović, Dušica	dusica.jovanovic@dh.uns.ac.rs	75, 77
Jovanović, Đorđe		51
Jovanović, Sonja		30
Jovanović, Zoran		30,31,36,68
Jović, V.		57, 66
Kamal, Khaja Mohaideen		33
Kamšek, Ana Rebeka	ana.rebeka.kamsek@ki.si	32,38
Karbovnyk, Ivan		48

Kasalica, Vidoje B.		52
Kavak, Sina	sinakavak@gmail.com	58,62
Khmara, Iryna	khmara@saske.sk	46
Kirilkin, Nikita		36
Klym, Halyna	klymha@yahoo.com	48, 49
Knežević-Jugović, Zorica		7,83
Kojić, Vesna		15
Koldžić, Filip	koldzic.filip@gmail.com	47
Koneracka, M.		46
Köster, Ulli		69
Kostić, Anđela		69, 80
Kostić, Milena		1
Kostiv, Yuriy		49
Kovač, Marija	marijakovac60@gmail.com	84
Kovačević, Avram	akovacevic@tfbor.bg.ac.rs	60
Kovačević, Lazar		16,29
Kovačević, Tihomir		41
Kretić, Danijela	danijela@chem.bg.ac.rs	24
Krneta-Nikolić, Jelena	jnikolic@vin.bg.ac.rs	82,85
Krstajić Pajić, M.		57,66
Krstić, Mladen		51
Kubovcikova, M.		46
Kuzmanović Nedeljković, Snežana	skuzmanovic@mobilja.rs	14
Kurko, Sandra		31
Latas, Nemanja	lnemanja998@gmail.com	34
Latko-Durašek, Paulina		64
Lazarević, Nenad		42, 43, 44, 63
Lazarević, Slavica		73
Lazić, Andrijana		81
Lerendegui-Marco, Jorge		69
Likožar, Blaž		33
Liu, Yu		42,43
Lončar, Anja	anja.loncar@ki.si	37,38

Lopičić, Zorica		76
Lu, Liu		65
Lukić, Jovan	jovanlukic@gmail.com	50
Lütfi Öveçoglu, M.		62, 71
Majaron, Boris		44
Majchrowicz, Kamil		64
Maksimović, Ana	aprodanovic@tmf.bg.ac.rs	26, 27
Marinković, Aleksandar		6
Marius, Pricop		54,55
Marković, Marina		78
Marković, Miljan	mmarkovic@tfbor.bg.ac.rs	78,86
Marković, Nikola		24
Marković, Smilja		13, 39,74
Martin, C.		63
Martin, R. M.		63
Martinez, V. A.		63
Mate, Diana-Denisa		19
Matić, Tamara		2, 4
Maugeri, Emilio Andrea		69
Medić, Aleksandra	akrstic 	81
Menshikh, Ksenia	ksenia.menshikh@uniupo.it	9,10
Mercatali, Laura		17
Mertdinç-Ülküseven, Sıddika	mertdinc@itu.edu.tr	62,71
Mhadhibi, Mohsen	mohsen.mhadhibi@inrap.rnrt.tn	28
Mihajlović, Gavrilo	gasa30091999@gmail.com	83
Mihajlovski, Katarina		80
Mihalcea, Ionut		53
Mijatov, Slavko		41
Mijatović, Aleksandra	aleksandra.mijatovic@gmail.com	59
Mijaković, Sara		31
Milano, S.		20
Milanović, Marija		21
Milanović, Zorana		12
Milenković, Branislav	bmilenkovic92@gmail.com	51

Miletić, Katarina	katarinamiletic@ff.bg.ac.rs	52
Milić, Marija		80
Milivojević, Milan		76
Milivojević, Milena		8,9, 11
Milojković, Jelena		76
Milosavljević, Ana	anam@ipb.ac.rs	43,44
Milošević, Mia	miaradonjic.tmf@gmail.com	8
Milošević, Milorad		42
Milović, Ljubica		26,27
Milović, Miloš		67
Milutinović, Marijana		52
Miljević, Bojan		84
Mirković, Marija		12
Mitić Ćulafić, Dragana		5
Misiak, Michał	michal.misiak.dokt@pw.edu.pl	64
Mišković-Stanković, Vesna		15
Mišurović, Jana		67
Mitrić, P.		63
Miola, Marta		10
Mladenović, Nemanja	nemanja.mladenovic@pmf.edu.rs	1
Mojsilović, Kristina		74
Mojsin, Marija		11
Molcan, M.		46
Moldovan, Ioana	ioana.moldovan12@gmail.com	19, 54,55,56
Moriau, Leonard		32
Mošić, Miloš		52
Mravik, Željko	mravik@vin.bg.ac.rs	31,36
Mutavski, Zorana	zmutavski@mobilja.rs	13
Neagu, Carina Sonia		56
Nedić Vasiljević, Bojana		30
Negrut, Daria	darianegrut@yahoo.com	19, 54,55, 56
Negrutiu, Meda Lavinia		19, 54,55,56
Neuhausen, Jörg		65
Nikolić, Ljubiša		1

Novaković, Zorica	novakovic.zorica111222@gmail.com	40
Novac ,Andreea Codruta		56
Obradović, Bojana		8,9,10, 11
Olejniczak, Andrzej		36
Onesto, Valentina		3
Opačić, Marko	marko.opacic@ipb.ac.rs	42,44,63
Osmolovskiy, Alexander		72
Özçakıcı, Yunus Emre		71
Panjan, Peter		29
Papović, Snežana		40
Pašti, Igor		30
Pavko, Luka	luka.pavko@ki.si	33,35
Pavlišić, Andraž		32
Pavlović, Marija		8
Pavlović, Neda		7
Pejić, Jelena	pejic@imgge.bg.ac.rs	11
Pešić, Jelena		43
Petković, Darija	darija.petkovic@vin.bg.ac.rs	68
Petričević, Aleksandar	apetricevic@tmf.bg.ac.rs	57,66
Petrović, Čedomir		42,43, 63
Petrović, Isidora		81
Petrović, Jana	janapetrovic52@gmail.com	73
Petrović, Jelena		9
Petrović, Jelena		12
Petrović, Predrag		14
Petrović, Rada		73
Petrović, Tamara	tamara@ffh.bg.ac.rs	67
Piper, Danica		21
Pirker, Luka		44
Pljevljakušić, Dejan		14
Podboršek, Gorazd Koderman		38
Pop, Daniela Maria		56
Popova, Elizaveta		72

Popović Bijelić, Ana		12
Popović, Aleksandra	apopovic@tmf.bg.ac.rs	70
Popović, Stefan	stefan.popovic@ki.si	33
Popović, Zoran		42,43
Poudel, A.		63
Prasad, Saumya		3
Procino, G.		20
Pupilli, Federico	federico.pupilli@studenti.unipd.it	45
Rac, Vladislav		74
Radan, Milica		13
Radmilović, Vuk		50
Radovanović, Jelena		22
Radovanović, Željko		73
Radović, Ivona		25
Radović, Marko		40,75
Radonjić, Mia		9,10
Rajačić, Milica		82,85
Rajić, Vladimir		34
Rauscher, T.		57, 66
Răzvan, Lăcătușu		19
Remškar, Maja		44
Ren, Weijun		63
Rizzo, Riccardo		3
Rimondini, Lia		10, 20
Rmuš, Jelena	jelenarmus@vin.bg.ac.rs	31,36
Rominu, Mihai		19, 54,55, 56
Ruffini, Andrea		45
Ruiz-Zepeda, Francisco		32, 35
Sarap, Nataša		82, 85
Saruhan Tekinşen, A.		71
Scalzone, A.		20
Schumann, Dorothea		53, 69
Schwirtlich, Marija		81

Serban, Christa		56
Shestakova, Anna	aashestakova_4@edu.hse.ru	72
Sinescu, Cosmin		19,54,55,56
Skuratov, Vladimir		36
Smiljanić, Danijela		76
Sprio, Simone		17, 18, 45
Srdić, Vladimir		21
Stalević, Marijana		61
Stamenković, Uroš		60
Stanislavljević Ninković, Danijela		81
Stanislavljević, Jelena	j.stanislavljevic2000@gmail.com	2
Stanković, Ana		39
Stanojev, Jovana		21
Stanojević, Novak	novakstanojevic1@gmail.com	22
Steinegger, Patrick		65
Stevanović, Magdalena		5
Stevanović, Milena	mstevanovic@tmf.bg.ac.rs	8,9, 11, 15, 81
Stojanović, Srna	srna@ffh.bg.ac.rs	74
Stojković Simatović, Ivana		31,39
Stojkovska, Jasmina		8,9,10, 11
Strbak, O.		46
Suhadolnik, Luka		33, 38
Surca, Angelija Kjara		33
Süzer, İlayda	suzeri@itu.edu.tr	62, 71
Sydoryk, I.		63
Szłązak, Karol		64
Šajatović, Vanja		23
Šavikin, Katarina		6,13,14
Šket, Primož		33
Škorić, Branko		16,29
Šožić Merkulov, Daniela		75,77
Šolajić, Andrijana		43
Šoštarić, Tatjana		76

Štrbac, Nada		78,86
Šušić, Nikola		52
Tadić, Julijana		4
Tampieri, Anna		17, 18, 45
Tanasković, D.		63
Tanner, D. B.		63
Tavoni, Marta	marta.tavoni@istec.cnr.it	17
Tekoğlu, Emre		58,62
Terek, Pal		16,29
Terek, Vladimir	vladimirterek@uns.ac.rs	16,29
Toković, Iva	ivatokovic@gmail.com	21
Tomić, Nina	b3014_2018@stud.bio.bg.ac.rs	5
Tursunović, Emina		82
Umičević, A.		63
Valuh, Mihajlo		84
Vasilić, Rastko		74
Vasiljević, Perica		1, 81
Veicht, Mario		53, 69
Veljković, Dušan		23,24
Veljković, Ivana		23,24
Veljović, Đorđe		2, 4
Veselinović, Ljiljana		39
Vesković, Ana		12
Virgil, Duma		54,55,56
Višić, Bojana		43, 44
Vranješ Đurić, Sanja		12
Vučetić, Snežana		84
Vučković, Milan		61
Vujković, Milica		67
Vukanac, Ivana		82, 85
Vukašinović-Sekulić, Maja		15
Vukmirović, Jelena		21

Vuković, Olivera	oliveravukoicic.olja@gmail.com	7
Vuković, Nikola		22
Zarić, Milana		25
Zavisova, V.		46
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Živadinović, Ivan	ivan.zivadinovic@psi.ch	65, 69
Živković, Jelena		6