

RAD 7



**BOOK OF
ABSTRACTS**

SEVENTH
INTERNATIONAL
CONFERENCE
ON RADIATION
IN VARIOUS FIELDS
OF RESEARCH

June 10-14, 2019
Herceg Novi
Montenegro



TABLE OF CONTENTS

A INVITED TALKS

Marina Frontasyeva	Atmospheric deposition of radionuclides – Assessment based on passive moss biomonitoring	2
Sebastien Incerti, Ivan Petrovic, Aleksandra Ristic-Fira	Monte Carlo simulation of early biological damage induced by ionizing radiation at the DNA scale: Overview of the Geant4-DNA project	3
Eiliv Steinnes	Radioecological studies in Norway related to the fallout from the Chernobyl accident	4
Kristina Gopcevic	Matrix metalloproteinases: From structure to function	5
Beata Brzozowska-Wardecka, Alice Sollazzo, Lei Cheng, Maciej Gałeczki, Adrianna Tartas, Lovisa Lundholm, Andrzej Wójcik	Studies on DNA damage and repair in cells exposed to mixed beams of different ionising radiation qualities	6
Igor Belyaev, Leonardo Makinistian	Towards ELF magnetic fields for the treatment of cancer	7

B PLENARY TALK

Jelena Ajtić, Vladimir Djurdjevic, Darko Sarvan, Erika Brattich, Miguel-Angel Hernández-Ceballos, Benjamin Zorko, Dragana Todorović	Temporal and spatial distribution of the beryllium-7 activity concentration in the surface air in Europe	9
-------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------	---

01 BIOCHEMISTRY

Šaćira Mandal, Adlija Čaušević, Sabina Semiz	Free fatty acids and hepatic activity in Type 2 diabetes	11
Sanja Petrovic, Jelena Zvezdanovic, Sasa Savic, Dragan Cvetkovic, Aleksandar Lazarevic, Dejan Markovic	UVB irradiation impact on chlorophyll degradation in methanol/water solutions monitored by UHPLC/DAD-ESIMS analysis	12

Srboljub Stanković, Aleksandar Jakšić, Boris Lončar, Dragana Nikolić, Mirjana Radenković	One numerical method for determining the absorbed dose of gamma and X radiation in the ZrO₂ dielectric within the MOS capacitor	197
Markéta Koplová, David Zoul, Vít Rosnecký, Helena Štěpánková, Václav Římal, Josef Štěpánek	Study of molecular mechanisms of radiochromic phenomenon in polycarbonate	198
Slavica Porobić, Milena Marinović-Cincović, Dragana Jovanović, Dušan Mijin	Radiation, thermal and optical properties of PVA films containing arylazo pyridone dyes	199
Aleksandra Sokić, Luka Perazić, Jovana Knežević	Measurement of ambient dose equivalent H*(10) in the surroundings of nuclear facilities in Serbia and abandoned uranium mine in Kalna via OSL dosimetry	200
Krzysztof Chelminski, Wojciech Bulski	The comparison of sensitivity of gafchromic EBT film types	201
G. Kramberger, V. Cindro, D. Flores, S. Hidalgo, B. Hiti, M. Manna, I. Mandić, M. Mikuž, M. Mikuž, D. Quirion, G. Pellegrini, M. Zavrtanik	Simulation and measurements of 3D silicon detectors timing performance	202
Stefan Ilić, Aleksandar Jevtić, Nikola Đikić, Goran Ristić	Smart Geiger Muller counter	203

24 RADIATION EFFECTS

Paulina Filipczak, Piotr Chudobinski, Szymon Bres, Malgorzata Matusiak, Slawomir Kadlubowski, Marcin Kozanecki	An impact of electron-beam and laser irradiations on Ag nanoparticles stabilized by sodium tricitrate	205
Valentyn Laguta, Maksym Buryi, Martin Nikl	Trapped-electron and trapped-hole centers in oxide scintillators	206
Maksym Buryi, Valentyn Laguta, Akira Yoshikawa, Martin Nikl	Point defect origin and local structure in LiCaAlF₆ single crystals	207
Oleh Shpotyuk, Valentina Balitska, Mykhaylo Shpotyuk	On the phenomenological identity of radiation-induced effects in glassy chalcogenides under a prism of unified configuration-enthalpy model	208
Suzana Samaržija-Jovanović, Vojislav Jovanović, Branka Petković, Slaviša Jovanović, Gordana Marković, Milena Marinović-Cincović, Jaroslava Budinski-Simendić	The effect of UV irradiation on hydrolytic stability of urea-formaldehyde resins filled with thermally modified montmorillonite	209

Juan Antonio Garcia Pascual	Operational experience and performance with the ATLAS pixel detector at the large hadron collider at CERN	210
Wojciech Migdał, Urszula Gryczka, Sylwester Bułka, Dagmara Chmielewska-Śmietanko, Magdalena Ptaszek, Anna Jarecka-Boncela	Application of low energy electron beam for surface treatment of agricultural products	211
Dagmara Chmielewska-Śmietanko, Urszula Gryczka, Wojciech Migdał, Jarosław Sadło, Kamil Kopeć	Effect of electron beam irradiation on paper-based materials	212
Afrodita Ramos, Blagica Cekova	Safety features of irradiated food	213
Sergey Stefanovsky, Olga Stefanovsky, Michael Kadyko, Jana Glazkova	The effect of irradiation with accelerated electrons and gamma-rays on the oxidation state and structure of sodium-aluminum-iron-phosphate glasses	214
Denis Ukolov, Roman Mozhaev, Maxim Cherniak, Alexander Pechenkin	Radiation hardness estimation method of complex optoelectronic devices on YB:YAG laser with semiconductor laser pump	215
Slaviša Jovanović, Jaroslava Budinski-Simendić, Milena Marinović-Cincović, Gordana Marković, Vesna Teofilović, Dejan Kojić, Nevena Vukić, Vojislav Jovanović	The influence of network precursor ratio on the crosslinking and radiation resistance of hybrid elastomeric materials	216
Anna V. Novikova, Viktor E. Novikov, Anna A. Oleshkevich	Possible role of intravascular hemolysis in the pathogenesis of oxidant stress after sublethal ionizing and non-ionising radiation dose effect	217
Mikhail Ksendzuk, Marina Filimonova, Valentina Surinova, Alexander Filimonov, Tatyana Podosinnikova, Alina Samsonova	Nitrogen monoxide metabolites as the marker of acute radiation syndrome	218
Andrey Tugai, Tetiana Tugai, Viktor Zheltonozhsky, Marina Zheltonozhskaya, Olena Polischuk, Leinid Sadovnikov, Natalia Sergeichuk	Activation of lipid peroxidation (LPO) is one of the universal effects of chronic radiation exposure	219
Narendra Jain	Age associated tritium vulnerability in postnatally developing Swiss albino mouse cerebellum	220
Mirella Tanori, Arianna Casciati, Barbara Tanno, Paola Giardullo, Alessandro Zambotti, Carmela Marino, Caterina Merla, Mariateresa Mancuso	New therapeutic strategy for medulloblastoma: μS-Pulse Electric Field exposure targeting cancer stem cells to promote radiosensitization	221

The effect of UV irradiation on hydrolytic stability of urea-formaldehyde resins filled with thermally modified montmorillonite

**Suzana Samaržija-Jovanović¹, Vojislav Jovanović¹,
Branka Petković¹, Slaviša Jovanović², Gordana Marković³,
Milena Marinović-Cincović⁴, Jaroslava Budinski-Simendić⁵**

¹ University of Priština, Faculty of Natural Science and Mathematics, Kosovska Mitrovica, Serbia

² Trelleborg Wheel System, Business Unit Agricultural & Forestry Tires, Ruma, Serbia

³ Tigar, Pirot, Serbia

⁴ University of Belgrade, Institute of Nuclear Sciences Vinča, Belgrade, Serbia

⁵ University of Novi Sad, Faculty of Technology, Novi Sad, Serbia

The hydrolytic stability of organic-inorganic nano-composites prepared by a two-stage polymerization of urea-formaldehyde resin (UF) filled with thermally activated montmorillonite (MMT) has been assessed before and after UV irradiation. The physical modification of MMT powder (type K10 with surface area 220 – 270 m²/g) was carried out by thermal treatment. The activated samples were designated as TA-K10 and the inactivated as NA-K10. The two types of urea-formaldehyde–MMT composites (UF/TA-K10 and UF/NA-K10) were synthesized. Obtained materials have been irradiated with different wavelengths of UV light (254 and 366 nm) and after that the hydrolytic stability was evaluated on the basis of free and liberated formaldehyde after acid hydrolysis. The free formaldehyde content in sample UF/TA-K10 that was irradiated was 0.60 % and it was smaller compared to the free formaldehyde content before irradiation (0.90 %). The content of the liberated formaldehyde from the modified UF composite which contains unmodified K10 was 2.04% compared to the cross-linked UF/TA-K10 where the content of the released formaldehyde was 2.82%. After UV irradiation of the UF/TA-K10 the content of the liberated formaldehyde decreased to 0.30% (for wavelength 254 nm) and 0.90 % (for wavelength 366 nm).

The influence of network precursor ratio on the crosslinking and radiation resistance of hybrid elastomeric materials

**Slaviša Jovanović¹, Jaroslava Budinski-Simendić¹,
Milena Marinović-Cincović², Gordana Marković³, Vesna Teofilović¹,
Dejan Kojić⁴, Nevena Vukić¹, Vojislav Jovanović⁵**

1 University of Novi Sad, Faculty of Technology, Novi Sad, Serbia

2 University of Belgrade, Institute of Nuclear Science Vinča, Belgrade, Serbia

3 Factory Tigar, Pirot, Serbia

4 University of Business Engineering and Management, Faculty of Engineering, Banja Luka, Bosnia and Herzegovina

5 University of Priština, Faculty of Natural Science and Mathematics, Kosovska Mitrovica, Serbia

Materials selected in nuclear processing plants are required to have radiation, thermal and chemical resistance. From experiments on different elastomeric seals materials it was assessed that after a high energy gamma treatment tremendous degradation of properties and compression set exist. Two common network precursors that are used in nuclear power plants are based on ethylene propylene diene rubber (EPDM) and chlorosulfonated polyethylene (CSM). Elastomeric materials based on CSM have good resistance to temperature extremes and chemicals but poor compression set and poor fuel resistance, which is limitation for its sealing application. Blending with other rubbers can improve these properties. *Polar* CSM rubber can interact with their active functional groups ($-\text{SO}_2\text{Cl}$) via substitution or condensation reactions. Hydrocarbon origin of EPDM completely saturated chains (without none double bond that imparts an excellent resistance to ozone, weathering, heat, oxidation and polar fluids) are able to absorb more energy without cracking polymeric chain (thus it is classified as radiation-resistant). EPDM rubbers are used in radiation areas for wire coating materials and electrical cables, due to their good resistance to environmental effects. This work aims to the study the influence of network precursor ratio on crosslinking behaviour and radiation resistance of hybrid materials based on CSM/EPDM and high abrasion carbon black particles (iodine adsorption value 82 g/kg). Rubber compounds were prepared using two-roll mill at 40 °C to obtain sheets, which were pressed at 160 °C during 20 minutes at pressure of 16 MPa. Optimal crosslinking time was determined by moving die rheometer (type MDR2000). It was assessed that the optimum curing time of obtained materials increases with increasing content of CSM. The radiation of prepared hybrid materials was carried out using ^{60}Co gamma source with the dose rate 10 kGy⁻¹ and different total absorbed dose (100, 200 and 400 kGy) at ambient temperature. For blends of two rubbers with dissimilar polarity, distribution of crosslink point can be non-equal through phases. Mechanicals properties and swelling properties were estimated for non-radiated and radiated samples. It was assessed that during radiation process, tensile strength, modulus and hardness and of prepared materials increased, but elongation at break decreased up to dose of 200kGy.

PUBLISHER: RAD Centre, Niš, Serbia
Bulevar Nikole Tesle 17/12, 18000 Niš, Serbia
www.rad-centre.org

FOR THE PUBLISHER: Prof. Dr. Goran Ristić

YEAR OF PUBLISHING: 2019

EDITOR: Prof. Dr. Goran Ristić

COVER DESIGN: Vladan Nikolić, PhD

TECHNICAL EDITING: Saša Trenčić, MA

PROOF-READING: Saša Trenčić, MA and Mila Trenčić, MA

CD BURNING AND COPYING: RAD Centre, Niš, Serbia

PRINT RUN: Electronic edition - 350 CDs (CD-R)

ISBN: 978-86-901150-0-6

The Seventh International Conference on Radiation in Various Fields of Research (RAD 2019) was financially supported by the Central European Initiative (CEI).

CIP - Каталогизacija y publikaciji
Narodna biblioteka Srbije, Beograd

539.16(048)(0.034.2)
57+61(048)(0.034.2)

INTERNATIONAL Conference on Radiation in Various Fields of Research (7 ; 2019 ; Herceg Novi)

Book of abstracts [Elektronski izvor] / Seventh International Conference on Radiation in Various Fields of Research, RAD 7, [RAD 2019], 10-14.06.2019 Herceg Novi, Montenegro ; [editor Goran Ristić]. - Niš : RAD Centre, 2019 (Niš : RAD Centre). - 1 elektronski optički disk (CD-ROM) ; 12 cm

Sistemski zahtevi: Nisu navedeni. - Nasl. sa naslovne strane dokumenta. - Tiraž 350.

ISBN 978-86-901150-0-6

a) Јонизујуће зрачење -- Дозиметрија -- Апстракти б) Биомедицина – Апстракти

COBISS.SR-ID 277775116



rad-conference.org

Silver sponsors



www.ortec-online.com



www.h3dgamma.com