



*Department of Chemistry and Technology of Polymers
Faculty of Chemical Engineering and Technology
Cracow University of Technology*

8th INTERNATIONAL SEMINAR ON MODERN POLYMERIC MATERIALS FOR ENVIRONMENTAL APPLICATIONS

including

Special Session

**“Polyhydroxyalkanoates:
Synthesis, Modification and Applications”**

Kraków, 17–19 May, 2023

PROGRAM



8th INTERNATIONAL SEMINAR ON MODERN POLYMERIC MATERIALS
FOR ENVIRONMENTAL APPLICATION

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Serge Bourbigot, Lille
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ORGANIZING COMMITTEE

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Konstantinos Raftopoulos
Jacek Wójcik
Paulina Zając

17 May (Wednesday)

- 11.00-14.00 Registration
- 14.00-14.15 Opening of the Seminar:
- Andrzej Szarata, Rector of the Cracow University of Technology
- Dariusz Bogdał, Vice-Rector for Science of the Cracow University of Technology
- Piotr Michorczyk, Dean of the Faculty of Chemical Engineering and Technology
- 14.15-14.45 Baljinder K. Kandola, Trishan Hewage, Muhammed Hajee, A. Richard Horrocks (INVITED)
“Low cost carbon fibres from lignin / bio-polyamide blends”
- 14.45-15.00 Aleksander Prociak - Special address on the occasion of 85th Birthday of Prof. Jan Pielichowski
- 15.00-15.15 Technical Break

Session Chairs: Angela Jedlovszky-Hajdu, Marek Pyda

- 15.15-15.30 Mária Omastová
“Hybrid nanostructures of two-dimensional materials and their applications”
- 15.30-15.45 Petr Lepcio, Martina Korčušková, Juraj Svatík
“Influence of nanoparticles on the curing, post curing, and properties of 3D printable polymer resins”
- 15.45-16.00 Kacper KroczeK, Łukasz Uram, Marek Potoczek, Katarzyna Bulanda, Krzysztof Balawender, Bogumił Lewandowski, Jacek Szczygielski, Stanisław Orkisz, Mariusz Oleksy
“Polylactide-based composites with hydroxyapatite used in rapid prototyping technology with potential for medical applications”
- 16.00-16.15 Renata Porebska, Artur Siwek
“Sustainable polymers as functional materials for applications in electrification devices”

- 16.15-16.30 Bogna Sztorch
“Application of silicon compounds in polymer materials for additive FDM print technology”
- 16.30-16.45 Marcin Zemła, Aleksander Prociak, Sławomir Michałowski, Ugis Cabulis, Mikelis Kirpluks, Kirils Simakovs
“Effect of reactive and additive flame retardants on the physical and mechanical properties of bio-polyurethane foams”
- 16.45-18.30 Welcome Party

18 May (Thursday)

Session Chairs: Janusz Datta, Baljinder Kandola

- 09.00-09.30 Bogdan Marciniak (INVITED)
“Advanced Materials Modified with Silicon Compounds via Catalytic Reactions”
- 09.30-09.45 Marek Pyda
“Liquid heat capacity of poly(lactic acid) and poly(vinyl methyl ether)”
- 09.45-10.00 Konstantinos N. Raftopoulos, Izabela Łukaszewska, Piotr Stachak, Carlos Bujalance Calduch, Jacobo Martínez Ramil, Krzysztof Pieliowski
“Hydration induced plasticization in non-isocyanate polyurethane systems”
- 10.00-10.15 Katarzyna Bialik-Was, Małgorzata Miastkowska, Anna Sycz
“Study of the release kinetics of active substances from bio-hybrid hydrogel materials”
- 10.15-10.30 Agata Hochół, Monika Flejszar, Paweł Chmielarz
“Synthesis of polyelectrolytes via ATRP methods in a proecological ethanol-based reaction medium”
- 10.30-10.45 Tuba Evgin, Mária Omastová
“Electrical conductivity of elastomer composites based on different dimension carbon materials: A comparative study”

10.45-11.15 **Coffee Break**

Session Chairs: Daniele Cangialosi, Mária Omastová

- 11.15-11.45 Said El Khezraji, Manal Chaib, Suman Thakur, Mohammed Lahcini, Raquel Verdejo (KEYNOTE)
“Synthesis of non-toxic and environmentally friendly thermosets”
- 11.45-12.00 Obinna Okolie, Jim Latto, Nadimul Faisal, Harvey Jamieson, Arindam Mukherji, James Njuguna
“Manufacturing defects in thermoplastic composite pipes for oil and gas applications”
- 12.00-12.15 Jan Krmela, Vladimíra Krmelová
“Design of methods for cyclic tensile testing of polymers”
- 12.15-12.30 Katarzyna Bulanda, Mariusz Oleksy, Rafał Oliwa, Kacper Kroczek, Dariusz Krajewski
“Polymer composites used in rapid prototyping technology”
- 12.30-12.45 Aleksander Hejna, Paulina Kosmela, Mateusz Barczewski, Joanna Aniśko, Joanna Szulc, Katarzyna Skórczewska, Adam Piasecki
“Brewing industry by-products as potential fillers for polymer biocomposites”
- 12.45-13.00 Ewa Jagusiak
““Project to reduce VOC/Fog emissions with a major reduction in odour level” – application of solution elastomers”
- 13.00-14.15 **Lunch**

Special Session:

“Polyhydroxyalkanoates: Synthesis, Modification and Applications”

Session Chairs: James Njuguna, Mariusz Oleksy

- 14.15-14.45 Maciej Guzik (KEYNOTE)
“Polyhydroxyalkanoate – polymers from bacteria – synthesis and applications”

- 14.45-15.00 Tomasz M. Majka, Krzysztof Pielichowski, Konstantinos N Raftopoulos, Maciej Guzik, Adam Szeligowski, Tomasz Witko, Olga Zastawny, Adam Kaczmarski, Anna Ślósarczyk, Aneta Zima, Ewelina Cichoń, Szymon Skibiński, Joanna Czechowska
“Selected properties of UV-aged polyhydroxybutyrate/ β -tricalcium phosphate [P(3HB)]/ β -TCP composites”
- 15.00-15.15 Szymon Skibiński, Joanna P. Czechowska, Ewelina Cichoń, Piotr Pańtak, Anna Ślósarczyk, Maciej Guzik, Aneta Zima
“Composite scaffolds based on β tricalcium phosphate and bacteria-derived polyhydroxyalkanoates”
- 15.15-15.30 Martyna Seta, Agata Gondek, Agnieszka Cudnoch-Jędrzejewska, Paweł Włodarski, Szymon Skibiński, Ewelina Cichoń, Aneta Zima, Maciej Guzik
“Different types of ceramic-polymer scaffolds as potential implants for bone regeneration”
- 15.30-15.45 Anna Gorczyca, Sebastian W. Przemieniecki, Marcin Niemiec, Szczepan Bednarz, Maciej Guzik
“Utilization of PHA production waste streams to plants fertilization and stimulation”
- 15.45-16.00 Beata Krzykowska, Iwona Zarzyka, Anna Czerniecka-Kubicka
“Bionanocomposites based on poly(3-hydroxybutyrate) matrix modified with aliphatic polyurethane and nanoclay”
- 16.00-16.30 **Coffee Break**
- 16.30-18.30 **Poster session**
- 20.00 **Gala Dinner**

19 May (Friday)

Session Chairs: Bogdan Marciniak, Emmanuel Richaud

- 09.00-09.30 Daniele Cangialosi, Sara Marina, Jaime Martin (INVITED)
“Intermixed glassy phase in polymer/fullerene mixtures for photovoltaics”
- 09.30-09.45 Mateusz Barczewski, Joanna Aniśko, Aleksander Hejna, Mariusz Marć, Marta Safandowska, Krzysztof Lewandowski, Zaida Ortega, Patryk Mietliński, Jacek Andrzejewski
“Valorization of disposable PLA products modified by chain extenders in rotational molding technology”
- 09.45-10.00 Riccardo Donadini, Michele Modesti
“Chemolysis of rigid polyurethane foam by a microwave-enhanced process”
- 10.00-10.15 Andrzej Rybak
“Thermoplastic elastomers for application as sealings in electrification devices in order to reduce leakage of greenhouse gases”
- 10.15-10.30 Xiao Zhang, Katarzyna Matras-Postolek
“Black magnetic Cu-g-C₃N₄ composites for photocatalytic H₂ generation and CO₂/benzene conversion”
- 10.30-10.45 Martyna Szatkowska, Kinga Pielichowska
“Sugar alcohols shape-stabilized by starch as phase change materials for long-term storage energy”
- 10.45-11.15 **Coffee Break**

Session Chairs: Piotr Król, Raquel Verdejo

- 11.15-11.45 Emmanuel Richaud (KEYNOTE)
“Thermal stability of methacrylic polymers, ELIUM® resin and its composites”
- 11.45-12.00 Beata Dudzic, Katarzyna Mituła, Monika Rzonsowska, Aleksandra Mrzygłód
“From the inside of silsesquioxanes to their macroscopic potential”

- 12.00-12.15 Szczepan Bednarz, Kacper Mielczarek, Samuel Wierzbicki, Ewa Mierzwa
„Itaconic acid: a little know renewable monomer”
- 12.15-12.30 Jolanta Pulit-Prociak
“Silver, Copper and Zinc Oxide nanoparticles as valuable additives in polymeric materials”
- 12.30-12.45 Georgia Michailidou, Alexandra Zamboulis, Dimitrios N. Bikiaris
“Novel chitosan/2-methoxy-4-vinylphenol modified chitosan blends and their application in 3D printing”
- 12.45-13.00 Anna Sienkiewicz, Piotr Czub
“The application of additives of natural origin to compositions based on epoxy resins”
- 13.00-14.15 **Lunch**

Session Chairs: Konstantinos Chrissafis, Aleksander Prociak

- 14.15-14.45 Angela Jedlovszky-Hajdu (KEYNOTE)
“Nanoparticle and polymer composite meshes for biomedical applications”
- 14.45-15.00 Katarzyna Matras-Postołek, Adam Żaba, Svitlana Sovinska, Paweł Dąbczyński
“Nanocomposite materials-based inorganic nanocrystals for photovoltaic devices”
- 15.00-15.15 Ewa Głowińska, Joanna Smorawska, Rafał Ilnicki, Janusz Datta
“Influence of chemical structure of hard segments on selected properties and processing of aliphatic bio-based polyurethanes”
- 15.15-15.30 Monika Topa-Skwarczyńska, Magdalena Jankowska, Filip Petko, Dominika Krok, Andrzej Świeży, Weronika Wańczyk, Małgorzata Noworyta, Joanna Ortyl
“Advances in application of novel photoinitiating systems in dental engineering as a key element in determining the required final properties of dental resin composites”
- 15.30-15.45 Katarzyna Pojnar, Barbara Pilch-Pitera, Piotr Król, Michał Kędzierski
“Antimicrobial acrylic powder coatings based on environmentally friendly biocides”

- 15.45-16.00 Akos Gyorgy Juhasz, Nanys Monika, Abdenacer Idrissi, Miklos Zrinyi, Angela Jedlovszky-Hajdu
“Characterizing the mechanical properties of electrospun polymer matrices with an affordable acoustic emission system”
- 16.00-16.15 **Closing of the Seminar**
- 17.00-19.00 Kraków Sightseeing

Posters

1. Nina Maria Ainali, Dimitrios N. Bikiaris, Dimitra A. Lambropoulou, *Aging behavior of common plastics under UV irradiation towards microplastics generation*
2. Nina Maria Ainali, Eleftheria Xanthopoulou, Iouliana Chrysafi, Electra Papadopoulou, Alexandra Zamboulis, Dimitrios N. Bikiaris
Evaluation of eco-friendly hemp fibers-reinforced recycled HDPE composites
3. Joanna Aniśko, Mateusz Barczewski, *The influence of filler particle size on antioxidant properties of polyethylene composites*
4. Mateusz Barczewski, Paweł Piaskowski, Joanna Aniśko, Aleksander Hejna, Paulina Kosmela, Olga Mysiukiewicz, *Influence of processing procedure on thermooxidative stability and mechanical properties of composites based on biobased polyethylene modified with waste black tea*
5. Szczepan Bednarz, Kacper Mielczarek, Samuel Wierzbicki, Ewa Mierzwa, *Itaconic acid: a little know renewable monomer*
6. Artur Bukowczan, Krzysztof Pielichowski, *Preparation of liquid crystalline polyurethane/POSS fibers via electrospinning technique*
7. Artur Bukowczan, Piotr Stachak, Krzysztof Pielichowski, *Using PY-GC/MS technique to determine thermal degradation products of non-isocyanate polyurethane/POSS nanocomposites*
8. Iouliana Chrysafi, Electra Papadopoulou, Kostantinos Chrissafis, *Synthesis and characterization of eco-friendlier resins based on phenol-formaldehyde and soy protein*
9. Iouliana Chrysafi, Eleftheria Xanthopoulou, Alexandra Zampoulis, Dimitrios N. Bikiaris, *Alternative and eco-friendly wood plastic composites based on poly(ethylene succinate) and hemp fibers*
10. Anna Czerniecka-Kubicka, Karolina Maternia-Dudzik, Weronika Gonciarz, Marek Pyda, *The biocompatible nanocomposites based on poly(3-hydroxybutyrate) and hypromellose. Thermal and biological properties*
11. Olga Długosz, Marcin Banach, *Modified ZnO nanocomposites as bioactive and photocatalytic materials*
12. Miłosz Frydrych, Bogna Sztorch, Bogdan Marciniak, *Synthesis and functionalization of borasilsesquioxanes*
13. Karolina Gałuszka, Wiktoria Tomal, Anna Chachaj – Brekeisz, Joanna Ortyl, *Organic/inorganic photocurable resins for 3D printing applications*

14. Arkadiusz Głowacki, Przemysław Rybiński, *Effect of lignocellulose filler on emission smoke, PCDDs/Fs and PAH during thermal decomposition of natural rubber composites*
15. Edyta Hebda, Aleksandra Cieślik, Krzysztof Pielichowski, *Bio-based carbonate erythritol and diamine derivatives of dimerized fatty acids as platform for the synthesis of non-isocyanate polyurethanes*
16. Aleksander Hejna, Paulina Kosmela, Adam Olszewski, Mateusz Barczewski, *Foamed flexible polyurethane/ground tire rubber composites modified with hybrid flame retardant compositions*
17. Paweł Jamróż, Dawid Kiesiewicz, Maciej Pilch, Joanna Ortyl, *Application of luminescent molecular thermometers to monitor the temperature of the composition during fast chemical reactions such as photopolymerization reactions in real time*
18. Magdalena Jankowska, Dominika Krok, Filip Petko, Emilia Hola, Patrycja Środa, Andrzej Świeży, Paweł Niezgodą, Katarzyna Starzak, Joanna Ortyl, *Photopolymerization nanocomposite initiated by photocatalytic initiating systems*
19. Catherine A. Kelly, Mike J. Jenkins, Krzysztof Hodor, Shona H. Marsh, *Characterization of Biopolymers: What's Different Compared to Conventional Plastics*
20. Katarzyna Kisiel, Izabela Zaborniak, Paweł Chmielarz, *Synthesis of (meth)acrylate-based copolymers for potential use as precursors of vitrimers by SARA ATRP*
21. Karolina Komisarz, Monika Kurczab, Tomasz M. Majka, Krzysztof Pielichowski, *Lignin as flame retardant for selected biopolymers*
22. Martyna Korbecka, Izabela Zaborniak, Paweł Chmielarz, *Thermosensitive polymers for potential application in the controlled release of active substances*
23. Dimitra Kourtidou, Evangelia Tarani, Dimitrios Karfaridis, George Vourlias, Dimitrios N. Bikiaris, Konstantinos Chrissafis, *Preparation and characterization of PVC composites containing various nanofillers for water service piping applications*
24. Vladimíra Krmelová, Jan Krmela, Andrej Dubec, *Evaluation of structure and properties of modified polypropylene fibres*
25. Eda Kumcuoglu, Alpaslan Turgut, Elif Begum Elcioglu, Tuba Evgin, Mária Omastová, *Parameter-Based Statistical Analysis of the Thermal Conductivity of Polyethylene-Based Carbon Filled Nanocomposites*
26. Maria Kurańska, Klaudia Śmietana, Marcin Zemła, Sławomir Michałowski, Aleksander Prociak, *Influence of the bio-polyol chemical structure on the properties of closed-cell polyurethane foams*
27. Malgorzata Latos-Brozio, Anna Masek, *Polymer compositions containing functional substances of plant origin*
28. Izabela Łukaszewska, Konstantinos N. Raftopoulos, Artur Bukowczan, Krzysztof Pielichowski, *Non-isocyanate polyurethane hydrogels modified with POSS: thermal and hydration properties*

29. Izabela Łukaszewska, Konstantinos N. Raftopoulos, Sebastian Lalik, Artur Bukowczan, Monika Marzec, Krzysztof Pielichowski, *Non-isocyanate polyurethanes: influence of secondary amino groups on thermal and mechanical properties*
30. Elżbieta Malewska, Aleksander Prociak, Maria Kurańska, Mirosław Bryk, *Selected properties of new thermo-reflective coatings for different applications*
31. Georgia Michailidou, Nikos Pardalis, Eleftheria Xanthopoulou, Alexandra Zamboulis, Electra Papadopoulou, Konstantinos Chrissafis and Dimitrios N. Bikiaris, *PLA-based composite materials to valorize wastes from olive-oil production*
32. Zuzanna Michno, Izabela Zaborniak, Paweł Chmielarz, *Synthesis of hydrophilic polymers in an aqueous environment by atom transfer radical polymerization*
33. Kacper Mielczarek, Monika Topa-Skwarczyńska, Sonia Bujok, Samuel Wierzbicki, Rafał Konefeł, Martina Nevoralová, Hynek Beneš, Joanna Ortyl, Szczepan Bednarz, *Itaconic acid – quaternary ammonium salts mixtures, effect of ammonium salts structure on the free-radical polymerisation of itaconic acid*
34. Ewa Mierzwa, Szczepan Bednarz, *Itaconic Esters Obtained by Enzymatic Esterification as Monomers for Non-polar Polymers*
35. Joanna Niesiołbiedzka, Ewa Głowińska, Paulina Parcheta-Szwindowska, Janusz Datta, *Influence of bio-based isocyanates on the structure and properties of polyurethanes*
36. Mariusz Oleksy, Katarzyna Bulanda, Kacper Kroczek, Rafał Oliwa, Dariusz Krajewski, *Hybrid polymer composites used in medicine*
37. Rafał Oliwa, Mariusz Oleksy, Katarzyna Bulanda, Dariusz Krajewski, *Epoxy composites with improved flame resistance and electrical conductivity*
38. Jan Ozimek, Katarzyna Malarz, Anna Mrozek-Wilczkiewicz, Edyta Hebda, Krzysztof Pielichowski, *Biological properties of HDI-based polyurethane/POSS hybrid composites*
39. Daria Pakuła, Robert E. Przekop, Bogdan Marciniak, *Octa(3-thiopropyl)silsesquioxane as a modifier of plastics*
40. Natalia Paprota, Kinga Pielichowska, *Thermochromic phase change materials for thermal energy storage*
41. Marek Piątkowski, Wojciech Łabuś, *Novel 3d-printed chitosan-based bioactive nanocomposites*
42. Szczepan Plewa, Maciej Rembisz, *Production of flexible polyurethane foams with components from renewable raw materials with use a protective foil*
43. Angelika Plota, Anna Masek, Jakub Naskręcki, *Influence of an Immobilized Stabilizer on the Photoaging Process of Polymer Composites*

44. Katarzyna Pojnar, Barbara Pilch-Pitera, Piotr Król, *Environmental friendly UV curing powder clear coatings materials*
45. Krzysztof Polaczek, Maria Kurańska, *Hemp seed oil as new source of raw materials for the synthesis of bio-polyols for open-cell polyurethane biofoams*
46. Justyna Prajsnar, Mateusz Tataruch, Ryszard Budno, Barbara Jachimaska, Maciej Guzik, Andrzej J. Bojarski, *Polyhydroxyalkanoates (PHA) as a source of chiral synthons for the production of new drugs*
47. Aleksander Prociak, Michał Kucała, Elżbieta Malewska, Natalia Koman, *Effect of temperature on selected mechanical properties of flexible polyurethane foams*
48. Karina Rusin-Żurek, Stanisław Kuciel, *Influence of addition of microcellulose fibers on the properties of antibacterial composites based on polypropylene from renewable sources*
49. Joanna Smorawska, Ewa Głowińska, *Influence of bio-based components on polyurethanes properties after multiple processing cycles*
50. Krzysztof Sołtys, Sławomir Michałowski, *Modification of microporous polyurethane elastomers using bio-polyols*
51. Piotr Stachak, Paulina Korzeniak, Edyta Hebda, Krzysztof Pielichowski, *Micro-structural studies of foamed non-isocyanate polyurethanes (NIPU) and NIPU/POSS composites, obtained by particle leaching method*
52. Karolina Stachowicz, Izabela Łukaszewska, Paulina Zając, Konstantinos N. Raftopoulos, and Krzysztof Pielichowski, *Hydrogen bonding and glass transition in non-isocyanate polyurethanes with a hydrophilic backbone*
53. Anita Staroń, Magda Kijania-Kontak, Mariusz Dziadas, Paweł Staroń Marcin Banach, *Obtaining of oil blocks from pyrolysis oil and their impact on environmental*
54. Anna Strzałka, Renata Lubczak, Jacek Lubczak, *Polyols obtained from chitosan*
55. Anna Strzałka, Jacek Lubczak, *Polyurethane foams with hydroxyalkylated chitosan units*
56. Katarzyna Suchorowiec, Piotr Szatkowski, Kinga Pielichowska, *Thermal properties of composites for solar–thermal energy conversion*
57. Kinga Ślusarczyk, Monika Flejszar, Paweł Chmielarz, Karol Wolski, *Tertiary amine in dual role of monomer and reducing agent in μ L scale SI-ATRP*
58. Wiktoria Tomal, Joanna Ortyl, *Water-soluble photoinitiators and the effect of non-reactive diluent on in situ photopolymerization processes and 3D-VAT printing*
59. Karol Tutek, Anna Masek, *Environmentally friendly copolymers*
60. Karol Tutek, Anna Masek, *Modifications of biodegradable polymers by grafted polymerization method*

61. Katarzyna Uram, Aleksander Prociak, Mateusz Barczewski, Paulina Kosmela, Sławomir Michałowski, Adam Piasecki, *Rigid polyurethane foams with various blowing agents and cellulose filler*
62. Marek Warzała, Kerstin Ledniowska, Jan Kania, Witold Mijał, Marcin Miska, Magdalena Zarębska, Ewa Sabura, *Technology of Poly(phenylene sulfide) production – polymer with unique properties*
63. Samuel Wierzbicki, Szczepan Bednarz, Krystian Mokrzyński, *Physical and chemical properties of n-butylammonium methacrylate – as a model of Protic Ionic Liquid Monomer*
64. Tomasz Witko, *Wet spun biodegradable and biocompatible 3D composite materials for medical applications*
65. Eleftheria Xanthopoulou, Dimitra Kourtidou, Konstantinos Chrissafis, Dimitrios N. Bikiaris, *Exploring the morphological and thermal features of PVC nanocomposites for piping applications*
66. Katarzyna Nowicka, Aleksandra Gejdel, Kinga Pielichowska, *The effect of magnetic particles on the selected properties of polyurethane-based biomaterials*
67. Karolina E. Mazur, Patrycja Bazan, Katarzyna Rybicka, Stanisław Kuciel, *Influence of antibacterial additives on mechanical and fatigue properties of composites based on thermoplastic elastomers*