

PERSONAL INFORMATION



Polymer Scientist,
Development of
Sustainable Polyesters

NEJIB KASMI, PhD

(One-page resume: [here](#))

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Personal website: <https://nejibkasmi.com/> | Peer-reviewed articles: 27, h-index: 18

Member of ACS Biomacromolecules Early Career Board (2024) *Bio*MACROMOLECULES ([LINK 1](#), [LINK 2](#))

A solid scientific background and proven track-record in developing fully biobased polyesters — made from renewable monomers — for sustainable Packaging Materials

➤ Guest Editor of [Special Issue](#) "Development of High-Performance Biobased Polyesters" in *Polymers* (Q1, IF: 5.0)

Scientific Societies: European network of FURAN based chemicals and materials FOR a Sustainable development (cost Action CA18220, [LINK](#))

Journals Reviewer: (Elsevier): *Polymer Testing* (Q1), *Materials Today Chemistry* (Q1), *Polymer Degradation and Stability* (Q1), *International Journal of Biological Macromolecules* (Q1), *Reactive and Functional Polymers* (Q1), *Journal of Supercritical Fluids* (Q1). (MDPI): *Polymers* (Q1), *International Journal of Molecular Sciences* (Q1), *Molecules* (Q2), etc.

Links related to Nejib's Profile:

Language(s): English (Proficient user), French (Independent user), German (Basic user), Arabic (Mother tongue)

Ph.D. in Polymer Chemistry

Master's Degree in Synthesis and Reactivity in Organic Chemistry

JOB-RELATED SKILLS AND EXPERTISE:

Development of biobased Polyesters for sustainable Packaging Materials / Bioplastics based on 2,5-furandicarboxylic acid - FDCA / Chemical recycling and valorization of plastics waste

- In-depth knowledge and technical understanding of the Design, Synthesis, and Study of fully biobased polymers, mainly homopolyesters, copolyesters, polyester blends and functionalized hyperbranched polyesters derived from 2,5-furandicarboxylic acid (FDCA) and other renewable monomers (isosorbide, vanillic acid, succinic acid, among others).
- Chemical Recycling of post-consumer 'polyester-type' plastics to value added circular materials by utilizing dynamic covalent chemistry (DCC) / Integrating plastic waste in the circular economy / plastic waste management
- Excellent command of several synthesis techniques of Polyesters: Melt Polycondensation, Solid state Polycondensation, Polymer Blending, Ring-Opening Polymerization, In Situ polymerization, etc.
- Furan-based Bioplastics: Sustainable polyesters, copolyesters, polyester Blends, Isocyanate-free polyester-urethane networks derived from FDCA / Investigation of crystallization, melting behavior, mechanical performance, and "enzymatic / in soil" biodegradability of renewable (Co-)polyesters / Biobased branched polyesters and polyester-urethanes / Organic chemistry / (Microwave-assisted) organic synthesis
- **Teaching experience** of Master's students (104 h) at KTH Royal Institute of Technology in Stockholm / Effective supervision skills (acquired through my experience as co-supervisor of BSc, MSc and PhD students).

PROFESSIONAL AND WORK EXPERIENCE

- 01/12/2023 R&D Project Leader / Polymer Synthesis Specialist
to present AVANTIUM company ([LINK](#)) Amsterdam, Netherlands
- 01/04/2023-30/11/2023 Researcher
Institute Charles Gerhardt Montpellier (ICGM), French National Centre for Scientific Research ([CNRS](#)), France
Research project: Development of reversibly designed crosslinked polymers based on dynamic covalent chemistry
- 01/11/2021-30/11/2022 Researcher
Department of fibre and Polymer Technology, KTH Royal Institute of Technology ([LINK](#)), Stockholm, Sweden
Research projects: - Microwave-assisted Chemical Recycling of post-consumer PET bottles into recyclable high-performance polyimines with exceptional mechanical performance, **significantly outperforming most of available commodity plastics in the market!** (research output: [LINK](#))
- Development of highly transparent polyurethane thermosets, prepared from 100% renewable branched polyesters, with "on demand" tunable mechanical and thermal properties and enzymatic degradability (research output: [LINK](#)).
- In 2022: Teaching "Polymer Physics course" (KF2140) to first-year Master students (104 hours) at KTH
- 01/06/2021-31/10/2021 Research Scientist
Helmholtz-Zentrum Hereon ([LINK](#)), Berlin, Germany
Research activities: Synthesis and characterization of multifunctional polyester-based biomaterials for adaptive and active polymer systems
- 01/03/2019-23/04/2021 Junior Research & Technology Associate
Department of Materials Research and Technology, Luxembourg Institute of Science and Technology ([LIST](#)), Luxembourg.
Research project: New biopolymers based on renewable building blocks from catalytic deoxygenation of hemicelluloses - CATBIOSE
- 01/04/2018-31/10/2018 Postdoctoral Fellowship
BIKIARIS Group ([LINK](#)), Laboratory of Polymer Chemistry and Technology, Aristotle University of Thessaloniki, Greece
Research project: *Furan-based Polyesters*
Main activities (supervision: Prof. Dimitrios Bikiaris, [LINK](#)): Design, Synthesis, and Study of new fully biobased Furanoate (Co-)polyesters and polyester blends from renewable resources-derived monomers

- 01/07/2017- 31/03/2018 **Temporary Research Fellowship**
 BIKIARIS Group, Aristotle University of Thessaloniki, Greece
Main activities (project: Furan-based Polyesters): Synthesis, investigation of crystallization behavior, and thermal analysis of biobased Furanoate (Co-)polyesters and sustainable polyester blends
- 16/09/2016- 30/06/2017 **Mobility grant within the frame of Erasmus+ International Programme**
 BIKIARIS Group, Aristotle University of Thessaloniki, Greece
Main activities: Different studies have been conducted on biobased poly(ethylene furanoate) polyester (**PEF**)
- 01/05/2016- 31/07/2016 **Research Assistant:** Polymer Engineering Group, University of Padova, Italy
Main activities (supervision: Prof. Alessandra Lorenzetti, [LINK](#)): Synthesis of rigid polyurethane foam insulation panels from new polyols based on renewable resources.
 Funding source: National Interuniversity Consortium of Materials Science and Technology, Italy
- 29/01/2016- 30/04/2016 **PhD Internship 3**
 Polymer Engineering Group, University of Padova, Italy
Main activities: Synthesis of thermoplastic polyurethanes from new aromatic monomers derived from isosorbide
- 10/05/2015- 10/07/2015 **PhD Internship 2**
 Polymer Engineering Group, University of Padova, Italy
Main activities: Microwave-assisted synthesis of new biobased chiral monomers derived from isosorbide
- 01/05/2014- 30/06/2014 **PhD Internship 1**
 Department of Civil, Chemical, Environmental, and Materials Engineering, University of Bologna, Italy
Main activities (supervision: Prof. Annamaria Celli, [LINK](#)):
 - Synthesis of new Isosorbide-based polyesters by melt polycondensation procedure
 - Learning of new synthesis techniques and physicochemical analysis method specific for polymers

AWARDS & ACHIEVEMENTS

- 7-13/07/2018 **Fully Funded Scholarship** to attend **IUPAC Postgraduate Summer School on Green Chemistry** – Venice, Italy
- 13/07/2018 **Best Presentation Award** at the IUPAC Postgraduate Summer School on Green Chemistry – Venice, Italy, awarded by **L'Oréal** Group and **Eni** Group. ([LINK](#))
 Presentation Title: *Synthesis of New Eco-Friendly Copolyesters From Fully Renewable Resources: Poly(ϵ -Caprolactone-Co-Pentylene 2,5-Furandicarboxylate)*
- Research project**
Furan-based polyesters (09.2016 – 10.2018): Investigation of polymerization conditions and catalysts for a variety of Furanoate polyesters, copolyesters and nanocomposites and how important parameters like thermal transitions, thermal degradation, biodegradability and mechanical properties are influenced.
 Collaborators: D.N. Bikiaris, G.Z. Papageorgiou, **N. Kasmi**, Z. Terzopoulou, L. Papadopoulos.

EDUCATIONAL QUALIFICATIONS

- Jan 2014- **PhD in polymer chemistry** (Merit: Very Honorable)
 Mar 2018 University of Monastir, Tunisia
 PhD dissertation Title: *Valorisation of Isosorbide: Synthesis of new functional polymers*
 Doctoral research activities were supervised by Professor Dimitrios Bikiaris from Aristotle University of Thessaloniki, Greece ([LINK](#))
- Sep 2011- **Master's degree in synthesis and reactivity in organic chemistry**
 Nov 2013 University of Monastir, Tunisia
 Master Thesis Title: *Synthesis and characterization of new functional structures based on isosorbide*
 With Distinction (16.50 /20). Final average mark (M1 +M2): 13.17/20. Number of acquired credits: 114/120
- Sep 2008- **Bachelor's degree in chemistry**
 Jun 2011 University of Monastir, Tunisia
 Number of acquired credits: 166/180 – (Rank: First year: 5/55, Second year: 7/59, Third year: 6/67)

PRESENTATIONS AT INTERNATIONAL CONFERENCES

- 3-5/04/2024 **FUR4Sustain COST Action conference** – Nice, France (Representing [Avantium](#))
 COST Action CA18220: European network of FURan based chemicals and materials FOR a Sustainable development
- 1-3/06/2022 1 communication at "**Nordic Polymer Days 2022**" – Gothenburg, Sweden
 • Designed from Recycled PET packaging waste. **N. Kasmi**, M. Hakkarainen
- 26-29/09/2021 1 communication at "**5th European Conference on Green and Sustainable Chemistry - 5th EuGSC**" –Thessaloniki, Greece
 • Tuning thermal properties and biodegradability of Isosorbide-based polyester by compositional control through copolymerization with 2,5-furandicarboxylic acid. **N. Kasmi**, Z. Terzopoulou, Y. Habibi, D.N. Bikiaris

- 15-17/07/2020 1 communication at "Milan Polymer Days Congress - MIPOL2020" – Milan, Italy
- Solvent-free synthesis of new fully biobased diol monomers through industrially viable approach: Toward new insights into the valorization of vanillic acid-based polyesters. [N. Kasmi](#), G.Z. Papageorgiou, D.N. Bikiaris
- 21-25/10/2019 1 communication at "6th EPNOE International Polysaccharide Conference" – Aveiro, Portugal
- Novel Fully Biobased Non-Isocyanate Polyurethanes from Hemicelluloses. [N. Kasmi](#), R. Dieden, D. da Silva-Perez, Y. Habibi
- 9-14/06/2019 1 communication at "European Polymer Congress 2019 (EPF 2019)" – Hersonissos Heraklion Crete, Greece
- From 2,5-furandicarboxylic acid to vanillic acid novel biobased polyesters with promising properties. [N. Kasmi](#), G.Z. Papageorgiou, D.N. Bikiaris
- 11-13/03/2019 1 communication at "Milan Polymer Days Congress - MIPOL2019" – Milan, Italy
- Synthesis, structure, and properties of novel biobased polyesters obtained from furan dicarboxylic acid and new fully renewable diols based on vanillic acid. [N. Kasmi](#), G.Z. Papageorgiou, D.N. Bikiaris
- 30/09/2018-03/10/2018 1 communication at "12th Hellenic Polymer Society International Conference 2018" – Ioannina, Greece
- Synthesis of new eco-friendly copolyesters from fully renewable resources: poly(ϵ -caprolactone-co-hexamethylene 2,5-furandicarboxylate). [N. Kasmi](#), G.Z. Papageorgiou, D.N. Bikiaris
- 7-13/07/2018 1 communication at "IUPAC POSTGRADUATE SUMMER SCHOOL ON GREEN CHEMISTRY" – Venice, Italy
- Synthesis of new eco-friendly copolyesters from fully renewable resources: poly(ϵ -caprolactone-co-pentylene 2,5-furandicarboxylate). [N. Kasmi](#), G.Z. Papageorgiou, D.N. Bikiaris
- 28-31/05/2018 1 communication at "Bordeaux Polymer Conference" - BPC 2018 - Bordeaux, France
- Synthesis of new fully biobased random copolyesters: poly(hexamethylene-co-isosorbide 2,5-furandicarboxylate). [N. Kasmi](#), G.Z. Papageorgiou, D.N. Bikiaris
- 11-13/9/2017 3 communications at "6th International Conference on Biodegradable and Biobased Polymers" - BIOPOL 2017- Mons, Belgium
- Synthesis of new fully renewable resources-based copolyesters: poly(1,4-cyclohexanedimethanol-co-isosorbide 2,5-furandicarboxylate). [N. Kasmi](#), M. Majdoub, G.Z. Papageorgiou, D.N. Bikiaris
 - Solid-state polymerization of poly(ethylene furanoate) biobased polyester: effect of catalyst type on molecular weight increase. [N. Kasmi](#), M. Majdoub, G.Z. Papageorgiou, D.N. Bikiaris
 - Crystallization and melting behavior of Poly(ethylene furanoate): Effects of molecular weight and nanofillers. G.Z. Papageorgiou, [N. Kasmi](#), V. Mandraki, S. Exarhopoulos, D.N. Bikiaris
- 2-7/07/2017 1 communication at "European Polymer Federation, EPF Lyon 2017" – Lyon, France
- Poly(ethylene-2,5-furanoate) (PEF); A promising polyester for food packaging applications: from research synthesis to reality. D.N. Bikiaris, V. Tsanaktis, Z. Terzopoulou, M. Nerantzaki, A. Chondroyannis, E. Karakatsianopoulou, [N. Kasmi](#), G.Z. Papageorgiou
- 15-16/2/2017 1 communication at "Milan Polymer Days, MIPOL2017" – Milan, Italy
- New thermally stable Isoidide-derived diols based on Isosorbide for the preparation of thermoplastic polyurethanes: Microwave-assisted synthesis and optimization. [N. Kasmi](#), M. Majdoub, M. Modesti, A. Lorenzetti
- 3-7/5/ 2015 1 communication at "International Symposium on Green Chemistry" - ISGC2015 - La Rochelle, France
- Synthesis and characterization of new polyurethanes based on isosorbide. [N. Kasmi](#), N. Hammami, M. Majdoub

REFEREED JOURNAL PUBLICATIONS ([LINK](#))

h-index ([Google Scholar](#)): **18** - **Top Co-authors**: Prof. Dimitrios Bikiaris ([LINK](#)): **[21]** - Prof. George Z. Papageorgiou ([LINK](#)): **[20]**

- Published papers (27)
- (27) [N. Kasmi*](#), Y. Chebbi, A. Lorenzetti, M. Hakkarainen*. Highly transparent polyurethane thermosets with tunable properties and enzymatic degradability derived from polyols originating from hemicellulosic sugars, *Green Chemistry* **2023**, 25, 9908-9925. [LINK](#)
- (26) [N. Kasmi](#), E. Bäckström, M. Hakkarainen*. Open-loop recycling of post-consumer PET to closed-loop chemically recyclable high-performance polyimines, *Resources, Conservation and Recycling* **2023**, 193, 106974. [LINK](#)
- (25) M. Safari, [N. Kasmi](#), C. Pisani, V. Berthé, A. J. Müller*, Y. Habibi. Effect of the structural features of linear bio-based polyester plasticizers on the crystallization of polylactides, *International Journal of Biological Macromolecules* **2022**, 214, 128-139. [LINK](#)
- (24) [N. Kasmi*](#), Z. Terzopoulou, Y. Chebbi, R. Dieden, Y. Habibi, D.N. Bikiaris. Tuning thermal properties and biodegradability of poly(isosorbide azelate) by compositional control through copolymerization with 2,5-furandicarboxylic acid, *Polym. Degrad. Stab.* **2022**, 195, 109804. [LINK](#)
- (23) D. G. Papageorgiou*, I. Tsetsou, R. O. Ioannidis, G. Nikolaidis, S. Exarhopoulos, [N. Kasmi](#), D. N. Bikiaris, D. Achilias, G. Z. Papageorgiou*. A new era in engineering plastics: compatibility and perspectives of sustainable aliphatic poly(ethylene terephthalate)/poly(ethylene 2,5-furandicarboxylate) blends, *Polymers* **2021**, 13(7), 1070. [LINK](#)

- (22) L. Papadopoulos, A. Zamboulis, **N. Kasmi**, M. Wahbi, C. Nannou, D. A. Lambropoulou, M. Kostoglou, G. Z. Papageorgiou, D. N. Bikiaris*. Investigation of the catalytic activity and reaction kinetic modeling of two antimony catalysts in the synthesis of poly(ethylene furanoate). *Green Chemistry* **2021**, *23*, 2507-2524. [LINK](#)
- (21) **N. Kasmi**, C. Pinel, D. Da Silva Perez, R. Dieden, Y. Habibi. Synthesis and characterization of fully biobased polyesters with tunable branched architectures. *Polymer Chemistry* **2021**, *12*, 991-1001. [LINK](#)
- (20) **N. Kasmi**, L. Papadopoulos, Y. Chebbi, G.Z. Papageorgiou, D.N. Bikiaris*. Effective and facile solvent-free synthesis route to novel biobased monomers from vanillic acid: Structure-thermal property relationships of sustainable polyesters. *Polym. Degrad. Stab.* **2020**, *181*, 109315. [LINK](#)
- (19) Z. Terzopoulou, M. Wahbi, **N. Kasmi**, G.Z. Papageorgiou, D.N. Bikiaris*. Effect of additives on the thermal and thermo-oxidative stability of poly(ethylene furanoate) biobased polyester. *Thermochim. Acta* **2020**, *686*, 178549. [LINK](#)
- (18) B. Quienne, **N. Kasmi**, R. Dieden, S. Caillol, Y. Habibi*. Isocyanate-free fully biobased star polyester-urethanes: synthesis and thermal properties. *Biomacromolecules*, **2020**, *21*, 5, 1943–1951. [LINK](#)
- (17) **N. Kasmi**, N. Ainali, E. Agapiou, L. Papadopoulos, G.Z. Papageorgiou, D.N. Bikiaris*. Novel High T_g fully biobased poly(hexamethylene-co-isosorbide-2,5-furan dicarboxylate) Copolyesters: Synergistic Effect of Isosorbide Insertion on Thermal performance Enhancement. *Polym. Degrad. Stab.* **2019**, *169*, 108983. [LINK](#)
- (16) **N. Kasmi**, M. Wahbi, L. Papadopoulos, Z. Terzopoulou, N. Guigo, N. Sbirrazzuoli, G.Z. Papageorgiou*. D.N. Bikiaris*. Synthesis and characterization of two new biobased poly(pentylene 2,5-furandicarboxylate-co-caprolactone) and poly(hexamethylene 2,5-furandicarboxylate-co-caprolactone) copolyesters with enhanced enzymatic hydrolysis properties. *Polym. Degrad. Stab.* **2019**, *160*, 242- 263. [LINK](#)
- (15) **N. Kasmi**, N. Pouloupoulou, Z. Terzopoulou, D.G. Papageorgiou*, D.N. Bikiaris, G.Z. Papageorgiou*. Sustainable Thermoplastics from Renewable Resources: Thermal behavior of Poly(1,4-cyclohexane dimethylene 2,5-furandicarboxylate). *Eur. Polym. J.* **2019**, *112*, 1-14. [LINK](#)
- (14) Y. Chebbi, **N. Kasmi**, M. Majdoub, P. Cerruti, G. Scarinzi, M. Malinconico, G. Dal Poggetto, G.Z. Papageorgiou, D.N. Bikiaris*. Synthesis, Characterization, and Biodegradability of Novel Fully Biobased Poly(decamethylene-co-isosorbide 2,5-furandicarboxylate) Copolyesters with Enhanced Mechanical Properties. *ACS Sustain Chem. Eng.* **2019**, *7*, 5501-5514. [LINK](#)
- (13) Y. Chebbi, **N. Kasmi**, M. Majdoub, G.Z. Papageorgiou*, D.N. Achilias, D.N. Bikiaris*. Solid-State Polymerization of Poly(Ethylene Furanoate) Biobased Polyester, III: Extended Study on Effect of Catalyst Type on Molecular Weight Increase. *Polymers* **2019**, *11*, 438. [LINK](#)
- (12) N. Pouloupoulou, A. Pipertzis, **N. Kasmi**, D.N. Bikiaris, D.G. Papageorgiou, G. Floudas, G.Z. Papageorgiou*. Green polymeric materials: On the dynamic homogeneity and miscibility of furan-based polyester blends. *Polymer* **2019**, *174*, 187-199. [LINK](#)
- (11) N. Pouloupoulou, **N. Kasmi**, M. Siampani, Z.N. Terzopoulou, D.N. Bikiaris, D.S. Achilias, D.G. Papageorgiou*, G.Z. Papageorgiou*. Exploring Next-Generation Engineering Bioplastics: Poly(alkylene furanoate)/Poly(alkylene terephthalate) (PAF/PAT) Blends. *Polymers* **2019**, *11*, 556. [LINK](#)
- (10) Z. Terzopoulou, E. Tarani, **N. Kasmi**, L. Papadopoulos, K. Chrissafis*, D.G. Papageorgiou, G.Z. Papageorgiou, D.N. Bikiaris*. Thermal Decomposition Kinetics and Mechanism of In-Situ Prepared Bio-Based Poly(propylene 2,5-furan dicarboxylate)/Graphene Nanocomposites. *Molecules* **2019**, *24*, 1717. [LINK](#)
- (9) **N. Kasmi**, M. Majdoub, G.Z. Papageorgiou*, D.N. Bikiaris*. Synthesis and crystallization of new fully renewable resources-based copolyesters: Poly(1,4-cyclohexanedimethanol-co-isosorbide 2,5-furandicarboxylate). *Polym. Degrad. Stab.* **2018**, *152*, 177-190. [LINK](#)
- (8) **N. Kasmi**, G.Z. Papageorgiou*, D.S. Achilias, D.N. Bikiaris*. Solid-State Polymerization of Poly(Ethylene Furanoate) Biobased Polyester, II: An Efficient and Facile Method to Synthesize High Molecular Weight Polyester Appropriate for Food Packaging Applications. *Polymers* **2018**, *10*, 471. [LINK](#)
- (7) **N. Kasmi**, Z. Terzopoulou, G.Z. Papageorgiou, D.N. Bikiaris*. Poly(1,4-cyclohexanedimethylene 2,6-naphthalate) polyester with high melting point: effect of different synthesis methods on molecular weight and properties. *eXPRESS Polym. Lett.* **2018**, *12*, 227-237. [LINK](#)
- (6) N. Pouloupoulou, **N. Kasmi**, D.N. Bikiaris, D.G. Papageorgiou, G. Floudas, G.Z. Papageorgiou*. Sustainable polymers from renewable resources: Polymer blends of furan-based polyesters. *Macromol. Mater. Eng.* **2018**, 1800153. [LINK](#)
- (5) **N. Kasmi**, M. Majdoub, G.Z. Papageorgiou*, D.S. Achilias, D.N. Bikiaris*. Solid-state polymerization of poly(ethylene furanoate) biobased polyester, I: Effect of catalyst type on molecular weight increase. *Polymers* **2017**, *9*, 607. [LINK](#)
- (4) **N. Kasmi**, M. Roso, N. Hammami, M. Majdoub, C. Boaretti, P. Sgarbossa, C. Vianello, G. Maschio, M. Modesti, A. Lorenzetti*. Microwave-assisted synthesis of isosorbide-derived diols for the preparation of thermally stable thermoplastic polyurethane. *Des. Monomers Polym.* **2017**, *20*, 547-563. [LINK](#)
- (3) Z. Terzopoulou, **N. Kasmi**, V. Tsanakis, N. Doulakas, D.N. Bikiaris*, D.S. Achilias, G.Z. Papageorgiou*. Synthesis and Characterization of Bio-Based Polyesters: Poly(2-methyl-1,3-propylene-2,5-furanoate), Poly(isosorbide-2,5-furanoate), Poly(1,4-cyclohexanedimethylene-2,5-furanoate). *Materials* **2017**, *10*, 801. [LINK](#)

- (2) Z. Terzopoulou, E. Karakatsianopoulou, [N. Kasmi](#), V. Tsanaktis, N. Nikolaidis, M. Kostoglou, G.Z. Papageorgiou, D.A. Lambropoulou, D.N. Bikiaris*. Effect of catalyst type on molecular weight increase and coloration of poly(ethylene furanoate) biobased polyester during melt polycondensation, *Polym. Chem.* **2017**, *8*, 6895-6908. [LINK](#)
- (1) Z. Terzopoulou, E. Karakatsianopoulou, [N. Kasmi](#), M. Majdoub, G.Z. Papageorgiou, D.N. Bikiaris*. Effect of catalyst type on recyclability and decomposition mechanism of poly(ethylene furanoate) biobased polyester, *J. Anal. Appl. Pyrolysis* **2017**, *126*, 357-370. [LINK](#)