



POLYMERS 2025, COMPOSITES 2025 AND 3BS MATERIALS TECH 2025 INTERNATIONAL JOINT CONFERENCE

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Book of Abstracts

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16 and 17 April 2025 at the Grande Real Foyer

(No posters sessions on 18 April 2025)

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1.	Recycling of mixed plastic waste: the effect of melt blending temperature on the structure and mechanical properties I. Rasilainen , V. Lahtela and T. Kärki	Ms. Ida Rasilainen , Lappeenranta-Lahti University of Tech., Finland
2.	Synthesis of new polymeric materials for use as coatings of a "homemade" SPME fiber for the analysis of toxic and hazardous compounds I. Jakubowska, B. Przybyła and P. Marć	Ms. Iwona Jakubowska , Military University of Technology, Poland
3.	Polymethylacrylate with High Molecular Weight Obtained via Radical Polymerization with Iron Hydrometallation Initiation A. Vignali , B. Palucci, F. Bertini and S. Losio	Dr. Adriano Vignali , Institute for Chemical Sciences and Technologies, Italy
4.	Synthesis of Bio-based and Biodegradable polymers from monomers from renewable Biowastes via Biocatalysis and Green Chemistry L. P. Fonseca	Prof. Luis Fonseca , Lisbon University, Portugal
5.	Bio-based Thermosetting Resins from modified Epoxidized Soybean Oil S. Silvano, A. Vignali, F. Zaccheria, L. Boggioni and F. Bertini	Dr. Fabio Bertini , CNR-Institute of Chemical Science and Technologies, Italy
6.	Is the adsorption of styrene on clay enhanced by polymer? E. Scholtzova	Mrs. Eva Scholtzova , Institute of Inorganic Chemistry, Slovakia
7.	Numerical Simulation of Mechanical Properties of Hybrid Composites E. Stankutė and R. Janulionis	Ms. Emilija Stankute , Lithuanian Energy Institute, Lithuania
8.	Enabling nanocomposite synthesis from nanoparticle-based bimetallic reactive systems N.A. Isaac , S. Biswas, J. Rangaraj, J. Pezoldt and H.O. Jacobs	Mr. Nishchay Angel Isaac , TU Ilmenau, Germany
9.	Hybrid Metal Oxide Heterostructures for Thermoelectric and Photovoltaic Applications M. Volkova, R. Meija, D. Gavars, A. Sarakovskis, A. Kons, D. Ertz and J. Andzane	Dr. Margarita Volkova , University of Latvia, Latvia
10.	Eco-Friendly Biocomposites from Chestnut Waste: Production, Optimization, and Characterization O.M. Freitas , S.B. Silva, P. Esfandiari, J. F. Silva and V.F. Domingues	Prof. Olga M. Freitas , ISEP-Polytechnic of Porto, Portugal
11.	Driving Sustainability in the Automotive Industry: Hybrid Yarns for Thermoplastic Biocomposites C. Oliveira , I. Costa, S. Silva, M. Silva and F. Oliveira	Mrs. Cristina Oliveira , Technology Centre for Textile and Clothing, Portugal
12.	Recovery of continuous carbon fibers from composites via plasma-enhanced solvolysis D. Marinis, E. Farsari and E. Amanatides	Dr. Ergina Farsari , University of Patras, Greece
13.	Cattail fiber as an alternative material for insulation panels: properties and variation in different harvest season S. Bibbo , M. Gibier, P. Alao, S.A. Käärmelahti, L. Bedel and S. Adamopoulos	Mrs. Silvia Bibbo , Univ. of Agricultural Science Uppsala, Sweden
14.	Bacterial cellulose-based antioxidant biodegradable composite films for food-sustainable packaging C. M. Kuo , S. Q. Huang, B. C. Shi, Y. R. Chang and Y. T. Chen	Dr. Chiu-Mei Kuo , Chung Yuan Christian University, Taiwan
15.	Bacterial Nanocellulose Based Materials for Oral Tablet Formulation in Colon Targeted Delivery of 5-Fluorouracil E. Martínez , A. Guarín, V. Villada, M. Osorio, Y. Vélez, M.E. Morales and C. Castro	Ms. Estefanía Martínez , Pontificia Bolivariana University, Colombia
16.	Application of multi-detection GPC Chromatography for detailed structural characterization of biodegradable synthetic polymers T. Baković , I. Šoljić Jerbić, L. Mandić and F. Faraguna	Ms. Tatjana Baković , Pliva Croatia Ltd, Croatia
17.	Development and Characterization of Crocin-Loaded Hyaluronic Acid/k-Carrageenan Hydrogels for Enhanced Topical Therapy in Chronic Wounds N. Genicio , A. Martins, E. Niza, L. Diego, A. Ribeiro, L. Pastrana, J. Gallo, S. Sillankorva and M. Bañobre-López	Mrs. Nuria Genicio INL - International Iberian Nanotechnology Laboratory, Portugal

Numerical Simulation of Mechanical Properties of Hybrid Composites

E. Stankutė^{1,2}, R. Janulionis²

¹ Faculty of Mechanical Engineering and Design, Kaunas University of Technology, Kaunas, Lithuania

² Laboratory of Nuclear Installation Safety, Lithuanian Energy Institute, Kaunas, Lithuania

Abstract:

Hybrid composites that incorporate synthetic fibers, such as glass, aramid and carbon, offer a balance of high strength, reduced weight and cost-effectiveness, making them highly applicable across various industries [1, 2]. This research focuses on numerical investigation of the tensile properties of these hybrid composites, with particular emphasis on the effects of stacking sequences on mechanical performance. Two configurations of hybrid laminates were simulated and analyzed, with different sequences of aramid and carbon fiber reinforcements arranged symmetrically in woven mat forms. This study uses a detailed finite element model to predict the tensile response of each configuration, allowing optimization of stacking arrangements for maximal tensile strength and durability. By comparing the numerical simulation results with experimental data found in the scientific literature [3], the research establishes a robust framework for analyzing and predicting the performance of synthetic fiber-based composites in applications requiring specific strength and durability. In this research, FEM code ABAQUS was used for the numerical simulation of tensile test. Few models of tension specimens with different stacking sequence layer arrangements of different fibers were created. Using the developed models, the tension test was

numerically simulated. As the simulation result, the stress-strain curves were determined. The validation of numerical simulation was achieved by comparing modeling results with experimental test results [3]. The comparison revealed a good coincidence between simulation and experimental results.

References:

1. Mei, Lv., Zheng, F., Wang, Q., Wang, T., Liang Y. Friction and wear behaviors of carbon and aramid fibers reinforced polyimide composites in simulated space environment, *Tribology International*, 92 (2015), 246-254.
2. Sun, Z., Shi, S., Hu, X., Guo, X., Chen, J., Chen, H., Short-aramid-fiber toughening of epoxy adhesive joint between carbon fiber composites and metal substrates with different surface morphology, *Composites Part B: Engineering*, 77 (2015), 38-45.
3. Karthik, K., Rajamani, D., Manimaran, A., Udayaprakash, J. Evaluation of tensile properties on Glass/Carbon/Kevlar fiber reinforced hybrid composites, *Materials Today: Proceedings*, 39 (2021), 1655–1660.

Keywords: mechanical properties, numerical simulation, finite element method, hybrid composite, aramid, carbon