



Universitatea  
Transilvania  
din Braşov

# **raMat 2022**

12<sup>TH</sup> INTERNATIONAL CONFERENCE ON MATERIALS SCIENCE & ENGINEERING

## **BOOK OF ABSTRACTS**

**Braşov  
ROMANIA**

**March 9 – 12,  
2022**

**[www.bramat.ro](http://www.bramat.ro)**



**Braşov – ROMANIA**  
**March 9 – 12, 2022**

# **BOOK OF ABSTRACTS**

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**Organized by**  
**Materials Science and Engineering Faculty**  
**Transilvania University of Brasov, Romania**



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## Conference Sections

- I. Metallic materials
- II. Biomaterials
- III. Ceramics, polymers and composite materials
- IV. Surface engineering
- V. Nanomaterials
- VI. Welding engineering and safety engineering
- VII. Additive manufacturing
- VIII. Engineering: Education and Entrepreneurship

Hall B = room U I 6

Hall C = room U I 3



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## Conference Venue

**Brașov** is situated in the central part of the country being considered the second most important town in Romania. Located 160 km from Bucharest (Romania's capital), Brașov is surrounded by the Carpathian Mountains, being in the middle of the country at the crossroads of the Eastern Carpathian and the Southern Carpathians. Across the mountains to the South and East there are Wallachia and Moldavia, to the West the Banat region and to the North the rolling hills of Northern Transylvania.

The 12<sup>th</sup> International Conference of Materials Science and Engineering – BraMat 2022, will be held at Sergiu T. Chiriacescu Aula, 41A Iuliu Maniu Str., Brașov, ROMANIA.

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## **Program (Outline)**

### **Wednesday, 09.03.2022**

- 16.00: Registration (Hall H)
- 16.30: Opening ceremony (Main Hall A)
- 17.00: Honorary Professor ceremony (Main Hall A)
- 17.30: Musical moment 1 (Main Hall A)
- 17.45: Plenary lectures 1 (Main Hall A)
- 19.15: Musical moment 2 (Main Hall A)
- 19.30: Welcome cocktail (Hall H)

### **Thursday, 10.03.2022**

- 9.00: Registration (Hall H)
- 9.30: Plenary lectures 2 (Main Hall A)
- 10.30: Coffee break (Hall H)
- 11.00: Plenary lectures 3 (Main Hall A)
- 12.00: Workshop (Main Hall A)
- 13.00: Lunch (Hall H)
- 14.30: Oral presentations 1 (Hall C)
- 14.30: Online presentations 1 (Main Hall A for audience)
- 14.30: Online presentations 2 (Hall B for audience)
- 16.00: MDPI Materials presentation (Hall C)
- 16.30: Coffee break (Hall H)
- 17.00: Online presentations 3 (Main Hall A for audience)
- 17.00: Online presentations 4 (Hall B for audience)
- 17.00: Poster presentations 1 (Hall G)
- 9.30 – 19.00: Companies exhibitions (Hall G)
- 20.00: Gala dinner (ARO PALACE HOTEL - night bar)

### **Friday, 11.03.2022**

- 10.00: Oral presentations 2 (Hall C)
- 10.00: Oral presentations 3 (Hall B)
- 10.00: Online presentations 5 (Main Hall A for audience)
- 11.30: Coffee break (Hall H)
- 12.00: Oral presentations 4 (Hall C)
- 12.00: Online presentations 6 (Hall B for audience)
- 12.00: Online presentations 7 (Main Hall A for audience)
- 12.00: Poster presentations 2 (Hall G)
- 14.00: Camp fire and barbeque (Garcini research base)
- 18.00: Closing Ceremony (Garcini research base)

### **Saturday, 12.03.2022**

- Free visit of Brasov city



### III.PO.03

## BIO-BASED POLYMERIC COMPOSITES INCORPORATING GRANULAR ACTIVATED ALGAE BIOMASS

Marius Bumbac<sup>1,2</sup>, Cristina Mihaela Nicolescu<sup>2</sup>, Radu Lucian Olteanu<sup>2</sup>, Stefan Cosmin Gherghinoiu<sup>1</sup>, Costel Bumbac<sup>3</sup>, Olga Tiron<sup>3</sup>, Elena Elisabeta Manea<sup>3</sup>, Cristiana Radulescu<sup>1,2</sup>, Laura Monica Gorghiu<sup>1</sup>, Sorina Geanina Stanescu<sup>2</sup>, Bogdan Catalin Serban<sup>4</sup>, Octavian Buiu<sup>4</sup>

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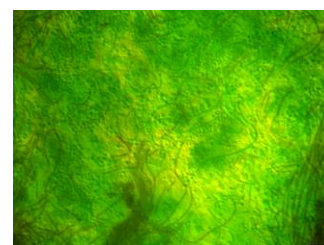
**Keywords:** bio-based composites, microalgae, biomass, granular activated algae

**Abstract:** Bio-based polymeric composites are obtained by incorporating into the structure of the base polymer matrix different biogenic materials from renewable resources such as microalgae, bacteria, and plants. Due to obvious environmental benefits and economic impact, this new category of advanced materials is gaining an increasing market share.

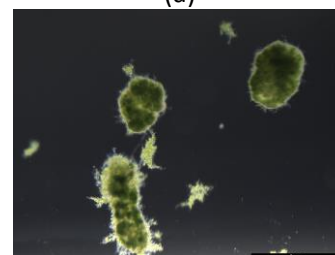
Photoautotrophic microalgae are valuable microorganisms able to harvest sunlight energy and capture CO<sub>2</sub> into biomass characterized by metabolic adaptability to environmental conditions, higher photosynthetic efficiency than terrestrial plants, and important content of value-added compounds (i.e. carbohydrates, lipids, proteins, pigments) [1-3]. Biochemical flexibility of these species as their metabolic property increased high attention into various biotechnological applications, microalgae being able to grow in either low or rich nutrient environments (including wastewaters) [4].

Microalgal biomass contains preponderantly three classes of macromolecular compounds (carbohydrates, proteins, and lipids) each content of these components depending on the growth conditions. In general, proteins represent 40-60 % of dry biomass, followed by carbohydrates (20-30%) and lipids (10-20%). A distinct feature of the microalgae cells is the presence of light-harvesting compounds represented by photosynthetic pigments (carotenoids, chlorophylls, and phycobilins) with a growing interest in various industrial fields [5-6].

Granular activated algae biomass used in GRAALrecovery technology is a mixture of microalgae and bacteria acting in an induced symbiotic relationship for wastewater treatment through nutrient uptake and resources recovery.



(a)



(b)

Fig. 1 – Granular activated algae biomass: light microscopy image (200x magnification) (a); stereomicroscopy image (b)





The study reports comparatively on major constituents composition in pure microalgae biomass vs granular activated algae biomass and their impact as biogenic filling material in bio-based polymeric composites. Tested recipes incorporated biogenic material in the range of 10-40%, and resulting materials were characterized for their mechanical and physico-chemical properties.

**Selective references:**

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