

XXI B-MRS Meeting



# XXI B-MRS Meeting

October 1st to 5th



BRAZILIAN MATERIA  
RESEARCH SOCIETY

## Maceió-AL, Brazil

October 1<sup>st</sup> to 5<sup>th</sup>, 2023

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| until April<br>17 <sup>th</sup> May<br>1 <sup>st</sup> | June 06 <sup>th</sup><br>June 25 <sup>th</sup> | until June<br>19 <sup>th</sup> June<br>29 <sup>nd</sup> | June 26 <sup>th</sup><br>July 07 <sup>th</sup> | until July<br>26 <sup>th</sup>      |
| Submission<br>of<br>Abstracts                          | Abstract<br>status<br>notification             | Submission<br>of Revised<br>Abstract                    | Final<br>Abstract<br>Notification              | Submission<br>for Student<br>Awards |

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## Welcome

The **Brazilian Materials Research Society (B-MRS)** and the **Committee of the XXI B-MRS Meeting** invite the worldwide community of materials research to attend the 2023 Meeting to be held at the Ruth Cardoso Cultural and Exhibition Center in **Maceió-Alagoas, Brazil, October 1st to 5th, 2023**.

This traditional forum is dedicated to recent advances and perspectives in materials science and related technologies. It will be an excellent opportunity to bring together scientists, engineers and students from academy and industry to discuss the state of Materials Science discoveries and perspectives.

Maceió is one of the main Brazilian capitals that has received many tourists mainly due to the receptivity of its inhabitants, the beautiful beaches with warm waters and extraordinary gastronomy. You will be very well welcome to Maceió. Do not miss this opportunity.

## Organizing Committee



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Federal de Alagoas

# Bioactive three-dimensional scaffolds inspired by bone extracellular matrix

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Carrageenan (Carr), a group of natural sulfated polysaccharides extracted from red algae of the Rhodophyceae family, has been widely applied in tissue engineering [1]. Its use is justified by the similar chemical structure compared to glycosaminoglycans, a matrix of polysaccharides present in the bone extracellular matrix [2]. Carr is capable of forming thermoreversible gels and its gelling behavior depends on the molecular characteristics of each Carr group, i.e. the amount of sulphate groups, and the addition of electrolytes [3]. Thus, the objective of this study was to synthesize and characterize 3D biomaterials containing Carr with improved properties to stimulate the biomineralization of osteogenic cells. In the first part of this study we analyzed the mechanical properties of hydrogels and membranes containing 3 and 5 wt % of  $\kappa$ - and  $\iota$ -Carr with the addition of KCl, NaCl, and CaCl<sub>2</sub> as crosslinkers. With the aid of a texturometer, we evaluated the mechanical behavior of the hydrogel and the stress, strain, and Young's modulus of the membranes. The results showed that  $\kappa$ -Carr forms stronger materials when compared to  $\iota$ -Carr. Even more, higher concentrations of Carr results in higher strength and resistance values. Also, each electrolyte acts differently on the groups of Carr, depending on the formulations as hydrogels or membranes. As next steps, we intend to evaluate the osteogenic properties of these samples in 3D osteoblasts cultures and their respective bioactivity and biodegradability. Summing up, we will correlate how different structures of Carr-based biomaterials affect the mechanical properties and the osteogenic, bioactive and, biodegradable properties.

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References: [1] Nogueira, et al., ACS Biomacromolecules, 24(3), 1258-1266, (2023); [2] Yegappan, R. et al., Carbohydrate polymers, 198, 385-400, (2018); [3] Thành, T. T. et al., Macromolecular chemistry and physics, 203(1), 15-23, (2002).