Structural and morphological characterization of the foam powder

Braulio H. K. Lopes [1]*, Roberto C. Portes[2], Alexsandra S. Monteiro[3], A. M., M. A. Amaral Junior [4], Jossano S. Marcusso[5], Gisele Amaral-Labat [6], Emersom S. Gonçalves[7], Mauricio R. Baldan[8], and Sandro F. Quirino[9],

[1]DCTA-INPE/LAS, [2]INPE/LAS, [3]I INPE/LAS, [4]INPE/LAS, [5]INPE/LAS, [6]USP/DEMM/LABAT, [7]DCTA/AMR, [8]INPE/LAS, [9]ETEP/INPE/LAS

1. Introduction

Porous carbon materials are products that have a wide application in the market, as they are easily found in several items of our daily life as the waste generated in Kraft pulping of the pulp and paper industry. This residue is rich in lignin, which can be easily worked to generate porous materials [1]. In this work, the structural and morphological characterization of porous carbon foams of a sustainable origin was performed aiming at their use as an attenuating material for electromagnetic radiation in aeronautical and aerospace environments.

2. Experimental

The materials will be prepared via chemical synthesis by modifying the methodology described in the literature [2] aiming at the integral use of the pulp and paper industry waste with a "polymerized resin". The acrylic polymer PMMA will be used in the medium in different granulometries for the development of porosity. The materials produced will be crushed and characterized via Raman and scanning electron microscopy and the electric will be performed through the network vector analysis combined with a waveguide in the microwaves range.

3. Results and Discussions

Figure 1 shows the structure of the generated material. It is formed by hemispheres with different orientations. In Figure 2, Rama spectroscopy reveals the presence of carbon, with two bands at 1356 cm^{-1} and 1608 cm^{-1}. The second order does not show peaks that define a crystallinity, so it reveals that the structure is amorphous. This amorphism allied to the hemispheres of the order of micro-particles suggests that this material can be used as a microwave radiation attenuator.

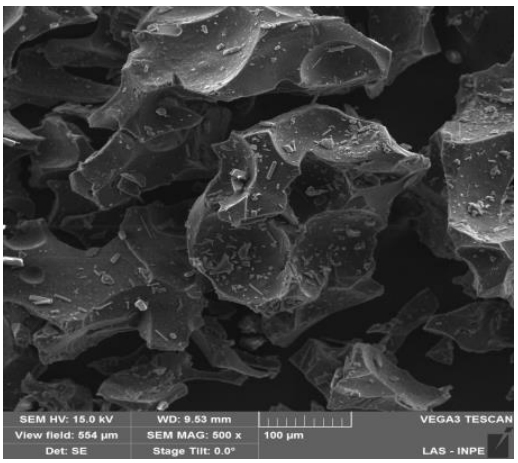

Fig. 1. *Electron microscopy of porous carbon.*

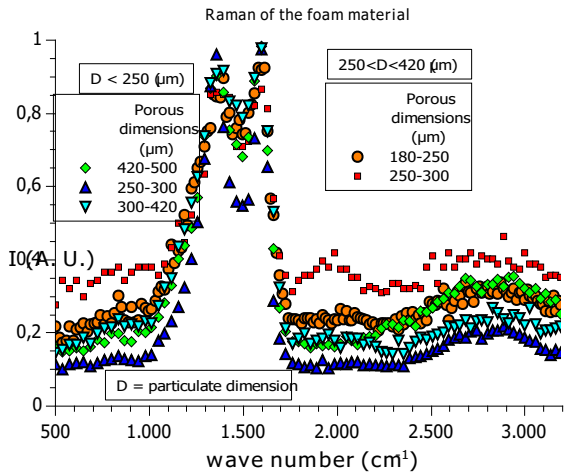

Fig. 2. *Raman porous carbon.*

4. References

[1] Grishechko LI, Amaral-Labat G, Szczurek A, Fierro V, Kuznetsov BN, Celzard A. Lignin – phenol – formaldehyde aerogels and cryogels. Microporous and Mesoporous Materials, 168, 2013b, 19-29.

[2] Seo J, Park H, Shin K, Baeck SH, Rhym Y, Shim SE. Lignin-derived macroporous carbon foams prepared by using poly(methyl methacrylate) particles as the template. Carbon, 76, 2014, 357-367.

*Corresponding author: place the email of the corresponding author here (bookman old style 9 pt)