THREE-DIMENSIONAL RENDERING OF BIOCHAR SURFACES FROM THEIR FESEM IMAGES

Amelia Carolina Sparavigna, DISAT, Politecnico di Torino, Italy
Email amelia.sparavigna@polito.it
Mauro Giorcelli, DISAT, Politecnico di Torino, Italy
Salvatore Antonio Guastella, DISAT, Politecnico di Torino, Italy

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As explained in [1], the design and functionalization of new materials, such as the biomaterials for instance, relies heavily on the ability of having an accurate measure and visualization of the three-dimensional surface architectures. Here we present a method for producing a three-dimensional surface model, obtained from the map of the brightness tones in a microphotography. In particular, in our work we are using the maps we can obtain from a two-dimensional analysis made by means of the field emission scanning electron microscopy (FESEM). This microscopy is providing topographical information of the surface [2].

The investigated material is the biochar, widely recognized as an efficient tool for carbon sequestration and soil fertility but also for new applications like composites [3]. Biochar chemical and physical properties are strongly linked to the initial material used and to the pyrolysis conditions. For instance, high-temperature pyrolysis led to biochar with a large surface area and high adsorption characteristics [4]. From the FESEM image of a biochar sample (see Fig.1, left), a three-dimensional mesh is obtained. The data of the mesh, the vertices and faces of which are given in a .obj file, can be easily visualized by 3D software, such as in the Fig.1, right panel.

Figure 1 – On the left, a FESEM image of biochar and, on the right, a possible three-dimensional rendering of it.

References

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