J Material Sci Eng 2017, 6:10 (Suppl)
DOI: 10.4172/2169-0022-C1-089

Agro-industrial waste for carbon nanotubes (CNTs) production through of methods of autoignition solvent and microwave irradiation

Pamela Hidalgo[1], **Renato Hunter**[1], **Gladys Coronado**[2] and **Maria Eugenia Gonzalez**[2]
[1]Universidad de La Frontera, Chile
[2]Universidad Católica de Temuco, Chile

Carbon nanotubes (CNTs) are used in broad variety of applications ranging from cars components to hydrogen storage. CNTs are light, robust, and highly conductive, both electrically and thermally whilst still being chemically stable. These properties may convert it in an important material for the future. The trouble is that the nanotube manufacturing process is not as sustainable and cost-effective. This study is presented the results of the evaluation of potential of agro-industrial wastes for CNTs production by methods microwave irradiation and solvents auto ignition conditions. In the CNTs production was used pyrolyzed biomass obtained of process of thermochemical conversion of waste biomass to biochar. The biomass wastes used were wheat straw, oat hulls, rapeseed cake and hazelnuts hulls. These feedstocks are commonly produced as agricultural byproducts and are obtainable in large quantities in south of Chile. All bio chars were produced in a period of 3h using a slow pyrolysis process. Bio chars were produced in a batch pyrolysis unit in two groups, one at 400°C and then at 600°C using N_2 as a carrier gas. In these processes, the biochar mass recovery was calculated as a percentage of the mass of feedstock input (dry wt) and biochar mass output (biochar mass/feedstock mass). The content of C, H, N and S were measured using a euro EA 127 3000 CHNS Elemental Analyzer after each pyrolytic process. Ash content was measured by calcination at 750°C during 3 h. A thermo-gravimetric analysis (TGA) to biomass wastes was made for determination of volatile components, moisture contents and ash. The C recovery efficiency after each pyrolytic process was calculated on a dry wt basis as biochar C mass/feedstock C mass. Bio chars produced was used for CNTs productions through of methods of auto ignition solvent using a batch reactor and microwave irradiation. Morphological analysis of CNTs was evaluated by scanning transmission electron microscopy (STEM), size determined by Dynamic light scattering method (DLS).

pamela.hidalgo@ufrontera.cl