FUNCTIONALIZATION OF PYROLYTIC COAL FROM AGROINDUSTRIAL WASTE BY CHEMICAL VAPOR DEPOSITION

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Agroindustrial waste is a source of renewable biochar used to obtain energy and produce structured carbon materials. This project studied the pyrolysis process followed by the Chemical vapor deposition (CVD) process, using soybean husk pyrolytic charcoal as a precursor of carbon nanoparticles. The study was carried out in three stages: the first stage was the characterization of the lignocellulosic material, in the second stage the pyrolysis and characterization of biochar, bio-oil and non-condensable gas products were made, the obtaining of materials by CVD of the pyrolytic coal obtained the soybean hull was realized on the third stage. The techniques used for the characterization of the material were XRD, FTIR, TGA, elemental analysis and ultimate analysis. The results obtained in the proximate analysis revealed 78% of volatile material and 2.3% of ashes, converting soybean hull into a product suitable for the thermal treatment of pyrolysis, due to the high thermal degradation of the material and the low percentage of ashes, reducing maintenance costs. A conventional pyrolysis was carried out where 22.9-32% of biochar was obtained. Biochar was characterized by XRD, SEM, TGA and DTA techniques. The results of TGA determined that at 400°C there is no significant loss of weight, due to the previous process of pyrolysis where most of the hemicellulose and cellulose is degraded at a temperature of 400°C. It was found that in the range 400-800°C the CVD process can improve due to the material’s weight loss of 35%, this percentage represents the material susceptible to be deposited in a substrate. The carbon particles obtained by CVD were characterized by SEM, where particles lower than 180nm were observed, and where promising results are expected when finding particles smaller than 50nm, a TEM analysis could corroborate or discard these results.

Keywords: Nanoparticles, Biochar, Pyrolysis

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