COMPARATIVE STUDY ON THE PROPERTIES OF COMMERCIAL AND SUGARCANE BAGASSE LIGNINS FOR GAS ADSORPTION APPLICATIONS

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Abstract: Lignin is a three-dimensional, amorphous, branched biopolymer with an aromatic nature, the second most abundant macromolecule in nature. It is currently used as an energy matrix in these same industries, which represents little added economic value, still depending on technical-scientific development. This work proposes the preparation of mesoporous graphite carbons from biomass, in order to physically adsorb volatile organic compounds from the working environment so that the health of the workers is guaranteed. Three samples were analyzed and characterized, a commercial one of the company SIGMA-ALDRICH, with low sulfonate content, extracted by Kraft process and two others extracted from sugarcane bagasse by the Alkali process. All samples were pyrolysed, with heating rate control at 5 ° C / min, at two predetermined temperatures of 400 and 800 °C in a conventional muffle, to obtain graphite materials. For the thermal analysis and stability study of the samples, TGA / DTG and DSC tests were performed, which showed a significant mass loss that may be related to the evaporation of smaller compounds present in the macromolecule. Changes in lignin structure were studied by infrared, where the loss of functional groups related to the main carbon structure occurred. For the observation of the graphite carbon, Raman spectroscopy was used, where characteristic peaks were observed, with higher intensity in the pyrolysed samples at 800 ° C. Morphological changes were studied using a SEM-FEG, in which two distinct morphologies were observed, one for the commercial sample and the other for the extracted samples. The MEV-EDS test was used to study the presence of pollutants due to the extraction method, and this was only observed in

the commercial lignin that had around 5% of sulfur. BET analyzes will be performed to verify the increase of the free surface area for the physical adsorption.

Keywords: lignin; mesoporous graphite carbons, characterization