

Chapter

Evaluation of the Possibility to Use By-Products of Gasification and Carbonization from Polymeric Residues and Biomass

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Abstract

The search for strategies that contribute to a circular economy, based on the valorization of by-products of the most diverse industries and processes, is one of the main objectives nowadays. This study aims to evaluate the possibility of the by-products valorization, resulting from gasification and carbonization of polymeric residues and biomass of natural origin, through their application in adsorption processes. The selected residues and carbon by-products resulting from the thermochemical conversion by gasification and carbonization processes, after their physical and chemical characterization, were evaluated intending to find if it was possible to improve their structural and chemical properties to apply them in adsorption processes. The characterization of the materials and samples prepared in this work involved a variety of analytical techniques as Thermogravimetric analysis (TGA), Polarized attenuated Fourier transform infrared spectroscopy (FTIR-ATR), X-Ray fluorescence (XRF) and Nitrogen Adsorption at 77K. It was possible to see that the material has between 40 and 50% of volatile matter and when carbonized these values are between 5 and 10%. Regarding the higher calorific value, the carbonized materials had an increase of approximately 9% in relation to the material without pre-treatment. It was verified that the apparent surface area (BET) of these chars was between 100 and 300 m²g⁻¹.