

2P159 THE ENHANCEMENT OF FUEL PROPERTIES OF LIGNOCELLULOSIC BIOMASS AND SEWAGE SLUDGE BY APPLICATION OF HYDROTHERMAL CARBONIZATION PROCESS

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HydroThermal Carbonisation (HTC) is a fast and straightforward pre-treatment process which involves the application of heat and pressure to convert organic raw material in the presence of water into a carbonaceous biofuel. Therefore, this process is especially dedicated for wet materials such as sewage sludge with even about 80 % moisture content. This study evaluates and compares the responses of lignocellulosic biomass and sewage sludge to their HTC treatment. All materials were subjected to HTC processes in an aqueous environment at 200 °C for 4 h and with 1:8 biomass to water ratio. The physical and chemical analyses and fibre, mercury porosimetry analyses and optical microscope images applied to both raw materials and to hydrochars, proved that HTC enhances the energy related properties of lignocellulosic biomass. Whereas, for sewage sludge, the HTC effect is not so evident, because most of the carbon moved to HTC liquid phase confirmed by high COD and high ash content in the sewage sludge hydrochar.

Subsequently, the thermo-chemical conversion kinetics of the raw and HTC materials were examined TGA. Based on TGA data the activation energy values were obtained with the Arrhenius and Coats & Redfern methods. The Coats & Redfern analysis gave activation energy values half lower for the sewage sludge hydrochars compared to lignocellulosic hydrochars. This indicates the potential of the HTC process to generate sewage sludge hydrochars to be co-combusted with other biomass solid fuels.

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