

2P184 CHLORINE ORGANIC COMPOUNDS RELEASE DURING BIOMASS TORREFACTION PROCESS

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Energy production from renewable sources is one of the Polish environmental policy priorities. Solid biomass (e.g. wood, agriculture wastes and energy crops) is widely available and easily implemented as an alternative to fossil fuels. However, due to high: moisture, volatile matter, alkali metals and chlorine contents it is also a source of some operational problems during direct combustion. Many valorization processes are employed to minimize the negative impact of biomass combustion on power boilers efficiency and durability. The torrefaction is a low-temperature pre-treatment process carried out in an inert atmosphere. Torrefied biomass is dry (hydrophobic), more brittle, biologically stable and has higher heating value than raw fuel.

In this work, the torrefaction process of agricultural biomass and energy crops was performed focusing on the investigation of the process temperature influence on chlorine-containing organic compounds release during this process. Torrefaction process was studied using TG analyzer with GC-MS used for the detection of gaseous products (torgas). Torrefaction temperature was held at 250, 300, and 350 °C, respectively, and residence time was specified as 1.0 h. Nitrogen was used as an inert gas. One of the key outcomes of this work was the detection of methyl chloride (CH₃Cl) during the torrefaction process. Additionally, it was confirmed that the amount of methyl chloride in torgas depends on the process temperature and Cl-association in fuel which was determined based on chemical fractionation method.

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