The 3rd Advances in Green Chemistry

BOOK OF ABSTRACTS

Poznan, Poland

26 -30 September 2022

Poznan 2022

About 3rd Advances in Green Chemistry

The aim of our conference is to create a place where leading scientists, both from Poland and Europe, will be able to share their latest achievements in five key research areas related to green chemistry, i.e., the area of ionic liquids, materials research, electrochemistry, catalysis and biosciences. The conference is to provide an impulse for scientists to discuss current research in these areas, initiate a discussion on the implementation and commercialization potential of the results, and be a platform for the emergence of new research ideas. This international meeting will create an environment which will promote the formation of new research partnerships between scientists from around the world, using their specialized knowledge and experience in specific areas. Special mention at **3rd AGChem** will have the technology of modern ecological materials, i.e., polymers, as well as the results of research on technologies for obtaining and recovering raw materials for their production. The thematic areas of the conference constitute of an entirety of research on green technologies, combining catalytic processes of production or processing of raw materials with application in electrochemistry (energy storage, energy acquisition) or biosciences. We would like to strongly emphasize the importance of research on ionic liquids as substances with versatile possibilities and great potential in virtually every thematic area of the conference. Ionic liquids are significant in the industry of the future; therefore they have their own thematic area at **AGChem 2022**. Close relationship between basic research and industrial exploitation of the results is the main idea behind this conference. International cooperation is the motto that should define this conference. We want the technologies and research presented by scientists to show the possibilities that they will provide to the society, what processes they improve and, most importantly, how they affect the environment. Everything that will be discussed at the conference will concern broadly understood term of green chemistry. These will include waste recycling technologies and their reuse or improvement of production processes, in which the impact on the natural environment will be reduced. In addition, we want to present the results of research on technologies dedicated to the circular economy and how research concepts are created in these areas "from idea to implementation". Another issue is the production of bio-based materials and biomaterials, considering environmental aspects and adapting new technologies to the changing global pro-ecological policy. Important, from the point of view of the end recipients - society, research in the areas of biosciences and agriculture will be presented, where we want to put special emphasis on research and implementation works on technologies that eliminate the use of plant protection products, for which there is no longer a place in the sustainable economy of the future. **AGChem 2022** is a conference that aims to show the scientific community and industry where we are in the areas of green chemistry, what we are currently working on and what research directions we have in global terms and present what we have already implemented.

Marcin Śmiglak
Conference Chair

Abstracts

in alphabetical order by name of the author

Evaluation of heating rate on the pyrolysis of residual biomass for biochar production

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Biochar is a carbon-rich solid product of biomass thermal conversion, which contains several properties for a wide range of applications that promote the attention of industries and researchers. The porous structure of char particles enables its application as soil fertilizer, adsorbent, and catalyst. Among technologies for biomass conversion, pyrolysis is widely used, consisting of a thermal decomposition process in absence of oxygen, to convert biomass into biochar, bio-oil and gases, generating no waste during the process [1].

The biomass used in this work was pellets. A fixed-bed vertical pyrolysis oven was used, with a heating rate alternating between 10, 20, 35 and 40°C /min, a retention time of 0.5 h, a maximum temperature of 500 °C, and an N_2 flow of 20 mL/min. The results of the pyrolysis runs are shown in Figure 1.

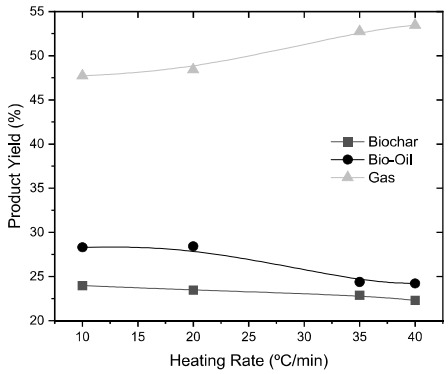

Figure 1. Effect of heating rate on the yield of biomass pyrolysis products

The increment of the heating rate caused a variation in the products yields. For the biochar and bio-oil fraction, the increment of the heating rate caused a reduction of its yield, at the same time raising the yield of the gas fraction. This could be caused by the fact that higher heating rates can provide more energy for the fractionation of the heavy carbonaceous biomass molecules into smaller ones, generating more gaseous particles at cost of biochar and bio-oil yield [2]. The production of biochar by pyrolysis of biomass proved to be a viable option for the valorization of a worldwide produced waste, at the same time producing a material with industrial interest. The heating rate plays a critical role in this process, as lower heating rates tend to enhance the production of biochar.

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References:

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