Title of the session: „Coal - coke - gas - hydrogen and carbon nanostructures in response to the idea of circular economy"

Date: 12 04 2019

Location of organization of the thematic session: – Międzynarodowe Centrum Kongresowe in Katowice, room 1

Time: 9:00 – 14:00,

Expected time of presentations: 15-20 min.

Supervisor of the session : Bogusław Smółka (605 250 960, bsmolka@jswinnowacje.pl)

Leader of the session: dr eng. Krzysztof Kwaśniewski, A Akademia Górniczo-Hutnicza im. Stanisława Staszica in Kraków, Faculty of Management

Description of the session:

The growing requirements of the European Union in the area of environmental protection are reflected in the increased restrictions and legal regulations related to the reduction of emissions of dust and greenhouse gases and also the circular economy. These restrictions mainly concern the use of coal, which is the basic fossil fuel both Poland and other European countries. The concept of a circular economy is treated as one of the foundations of the idea of sustainable development, therefore it is preferentially implemented in the industry, also in the mining and processing industry of hard coal.

The coal as well as other extracted and non-renewable hydrocarbons can be used effectively in many branches of the economy. Nowadays technological progress in the power industry allows to burn coal with significantly higher efficiency, but also in a much cleaner way than it was a decade ago. Hard coal is not only about the energetics, but also carbochemistry related to petrochemistrywhich uses coking coal being on the EU list of critical raw materials. Hardly anyone realizes that coking industry is a modern chemical plant that produces not only coke, but also a number of valuable carbon-based products that are raw materials for the production of highly processed products. In the coking process besides coke there are also produced coke oven gas, benzol and coke pitch. The gas formed in the coking process can be a raw material for the extraction of hydrogen or for the further chemical syntheses. The dynamic development of fuel cells has led to interest in the use of high purity hydrogen as a fuel in the automotive industry, which can become an alternative to battery vehicles.

The products of energo-chemical coal processing (pyrolysis, gasification, etc.), constitute an attractive raw material for clean coal technologies. Their use is associated with the production of highly developed products (hi-tech), thus enabling the most effective use of coal and closure of the carbon circulation. The use of coal for the production of activated carbons used for water and exhaust purification will help reduce the negative impact of industry on the natural environment. There are other technologies due to which coal and its processing products can become a raw material for the production of ecological, modern products, such as nanostructures and carbon fibers, intended for the production of composite materials, further used to produce structures that reduce the mass of vehicles, thereby reducing their exhaust emissions. Other products, such as graphite coatings or carbon anodes, can be used in dynamically developing electromobility. The products obtained as a result of coal processing are increasingly used in the most modern technologies related to highly specialized industries (including IT, medicine, material engineering).

The subject of session refers to described above processes with highlighted role of innovative coal technologies implemented within the idea of a circular economy.