Environmental and analytical aspects of monitoring and reduction of mercury emission from coal combustion in Polish energy sector

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The understanding of mercury environmental cycles described as a series of chemical and physical transformations is important because mercury and its compounds are very toxic and some of its forms (i.e. methylmercury, ethylmercury etc.) have high ability of accumulation in living organisms. Thus determination of mercury emission sources, its analytical determination and speciation leading to methods of its capturing are among important issues.

In global scale mercury transport and distribution in the environment involves the atmospheric circulation. More local scope is connected with the methylation of inorganic mercury mainly from anthropogenic sources.

There are many technologies generating mercury to the environment. These are mainly linked to energy production, fuels and wastes combustion, cement production and metallurgy. In other sectors of human activity as chlorine production, paper industry, pharmaceuticals and cosmetics production, agriculture and mercury catalysts the mercury emission has been either eliminated or significantly limited.

Nearly 60% of energy in Poland comes from coal combustion in coal-fired power plants. One estimates that 68% of mercury output in Poland origins from brown coal whereas 10% from hard coal and about 17% from copper ore as the raw materials. Brown coal power plants produce about 40% of the total energy whereas 56% is generated from hard coal-fired power plants.

Poland is also ranked among top coke producers with its 10.6 mln ton of coke production in 2010.

Problem of mercury emission control from energy sector requires more general approach but based on good geochemical and analytical background. It becomes an important issue also in global scale when considering legal regulations to be implemented in EU and further globally in the next two to three years.

There are problems of good inventory taking into account mercury content in Polish coals, analytical, chemical and technical problems of emission control and environmental consequences of any failures or negligence in these fields. This kind of studies is cur-

rently performed in Poland by a team of researchers in cooperation with the leading companies of the energy sector which are particularly interested in final results.

Preliminary data on those issues will be presented as a part of the results from the nationwide projects performed currently in Poland.

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