



Alteration of municipal and industrial slags under atmospheric conditions

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The Waste Management System in Poland is being consequently built since 1998. After important changes in legislation, local governments have taken over the duty of waste collection. New points of selective collection of wastes have been opened and new sorting and composting plants were built. The last stage of introducing the Waste Management System is construction of waste incineration power plants. From nine installations which were planned, six are now under construction and they will start operating within the next two years. It is assumed that the consumption of raw wastes for these installations will reach 974 thousand tons per year. These investments will result in increased slags and ashes production.

Now in Poland several local waste incinerators are operating and predominant amount of produced incineration residues is landfilled. These materials are exposed to atmospheric conditions in time of short term storage (just after incineration) and afterwards for a longer period of time on the landfill site. During the storage of slags low temperature mineral transformations and chemical changes may occur and also some components can be washed out. These materials are stored wet because of the technological processes.

The aim of this study is to investigate the influence of storage in atmospheric conditions on slags from incineration of industrial and municipal wastes. The experiment started in January 2013. During this period slag samples from incineration of industrial and municipal wastes were exposed to atmospheric conditions.

Samples were collected after 6 and 12 months. Within this time the pH value was measured monthly, and during the experimental period remained constant on the level of 9.5. After 6 months of exposure only slight changes in mineral compositions were observed in slags. The results of XRD analysis of municipal slags showed increase in content of carbonate minerals in comparison to the raw slag samples. In industrial slags, a decrease in content of soluble minerals, like halite, in comparison to the output samples was noted. These phases were probably dissolved and washed out from the samples. After 12 months of atmospheric exposure in municipal slags only slight changes in weight (1 wt%) were observed, whereas in industrial slags slightly above 10 wt% of the material was removed.

After 12 months of atmospheric exposure more significant changes are expected such as changes in chemical and mineral compositions and changes in heavy metals and toxic elements concentrations due to leaching.