

Krasnoyarsk scientists propose building materials and sorbents from RUSAL's waste

Researchers from Siberian Federal University have studied 45 types of waste generated by RUSAL, defined hazard classes and estimated the amount of raw materials that can be recycled annually. It turned out that 14 types of waste can be successfully used as functional additives in building materials and materials for road construction, as well as become the basis of sorbents intended for the treatment of industrial wastewater.



"Since 2016, we have been studying and classifying solid waste from RUSAL enterprises, and managed to identify two main areas in which they can be re-used. First of all, this is the manufacture of sorbents from scrap brick lining of aluminium electrolyzers for aluminium smelting. The production of a mineral additive for asphalt concrete has also proven itself well, as it gives the usual material increased physical, mechanical and strength properties,"

explained **Olga Dubrovskaya**, associate professor of the Department of Engineering Systems of Buildings and Structures, Siberian Federal University.



The chemical composition of the waste was determined by X-ray fluorescence using X-ray fluorescence analysis. In addition, the researchers picked out substances suitable for modification of the sorbent — oxides of aluminium, iron, silicon and titanium — in the optimal ratio, which resulted in producing functional active sorbents with advanced technical and operational properties and low costs for mechanical grinding and activation. The researchers highlight that the resulting recycled products have already passed a number of laboratory and industrial tests. For example, the sorbent has already proven its effectiveness in extraction of heavy metals and emulsified oil products on reference wastewater and industrial wastewater of UC RUSAL.

"We are working with several large regional partners, including Achinsk Oil Refinery, Achinsk Cement, Krasnansky, and Krasnoyarsk Expanded Clay Plant. Currently, they are testing and adopting additives developed at SibFU into their production cycle. I guess that large industrial stakeholders who follow the current trend towards increasing the environmental friendliness of production will be interested in this product," continued **Ms Dubrovskaya**.

The sorbents are produced on the basis of SibFU by a large research team involving students and lecturers of the School of Engineering and Construction. In the near future, the researchers are going to study the remaining types of waste of the aluminium mastodon, which, according to the preliminary data, are more than 200 types. The researchers will probably find new green applications for some of them.

This work was supported by the Russian Foundation for Basic Research and the Government of the Krasnoyarsk Territory within the framework of research project 18-41-242008.

25 september 2020

© Siberian federal university. Website editorial staff: +7 (391) 246-98-60, info@sfu-kras.ru.

Web page address: <https://news.sfu-kras.ru/node/23624>