SibFU scientists help trace germanium to collect itself

SibFU scientists have obtained sorbents based on silicon and aluminum oxides, layered with reagents with functional groups of tiron, for extraction, concentration and determination of germanium (IV) out of complex systems. The obtained sorbents will make it possible to determine the microcontent of germanium in objects that are difficult to analyze, for example, lignites, microelectronics waste, wastewater and process water at manufacturing.

Germanium is a solid substance with a metallic luster, having a gray-white, sometimes silver or black color. It is referred to as trace elements, which means that germanium does not occur in native form in nature. However, the content of this element in the earth's crust is greater than, for example, antimony, silver or bismuth. A germanium ingot costs almost as much as a gold ingot. The metal is brittle, almost like glass, and it can be easily broken by simply dropping an ingot.

Main germanium consumers nowadays are such industries as fiber and thermal optics, electronics, nuclear physics. Metallurgy consumes a certain amount of germanium. Germanium oxide is in demand in the production of wide-angle camera lenses, optical microscopes, as well as in chemical processes as a catalyst in the production of plastic (PET). Since germanium belongs to trace elements, i.e. it practically does not form its own deposits, this poses a difficult task for analytical chemists to detect it in complex objects.

"*When determining germanium, it is often impossible to do without its preliminary concentration. We have proposed a sorbent based on silicon or aluminum oxides, layered with reagents with functional groups of tiron. This reagent forms stable complex compounds with germanium(IV), so synthesized sorbents extract germanium(IV) from low pH value solutions. At the same time, most of the macro components of the analyzed object are not sorbed under these conditions, which allows not only to concentrate germanium for further detection by spectroscopic methods, but also to separate it from interfering components,*" said **Olga Buyko**, senior researcher at SibFU Laboratory of Physical Chemistry of Metallurgical Processes and Materials.

Interestingly, small amounts of germanium do not have a physiological effect on plants and animals, but can be toxic in large quantities.

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