

## New sorbent for the removal of arsenic from drinking waters

The importance of drinking water is continuously increasing all over the world. This is due to the fact that the world's population is rapidly growing while the quantity of available water reserves is diminishing. Among the various water-contaminating materials, arsenic is one of the most dangerous components to human health. The arsenic content of waters can increase under natural circumstances as well, however, growth of arsenic content in waters can be also attributed to industrial and agricultural activities. Getting into the human body even a small amount of arsenic causes serious poisoning, or slowly developing illnesses like skin cancer. Because of the above, the arsenic concentration limit of drinking waters is defined more and more strictly. Compared to the former concentration limits of arsenic in drinking waters (50 µg/l then later 30 µg/l, or ppb), the actual level accepted by both the European Union (Directive 98/83/EC 1998) and by the US Environmental Protection Agency (US EPA 2002b) is 10 µg/l. Many drinking water sources cannot meet this strict requirement any more. As a result, arsenic removal technologies get more and more often into the focus of attention.

Several technologies have been developed for the removal of the arsenic content of drinking waters. One of them is reverse osmosis. According to this technology the water is pressed with high pressure through a semipermeable membrane. Applying reverse osmosis all the contaminants and ions are removed. The disadvantages of reverse osmosis are its high costs and that the cleaned water must be re-salted after cleaning. Inorganic arsenic content of waters can be removed by precipitation and filtering, i.e., adding chemicals an insoluble arsenic salt is precipitated that can be filtered out. Arsenic containing organic compounds cannot be removed this way. Another disadvantage of precipitation is that unless the technological parameters are kept very strictly the efficiency of the removal is low. The most widespread technology for arsenic removal today is based on adsorption. The arsenic content of the water is adsorbed in a packed column, onto the surface of crystalline iron-hydroxide. The drawback of classical adsorption is that small iron oxide and iron-hydroxide particles easily get loose from the surface of the sorbent, hence arsenic re-enters the water and the cleaning efficiency deteriorates.

The G.I.C. Industrial Servicing and Trading Ltd. developed a brand new nanotechnology-based sorbent material for the adsorption of the arsenic content of drinking waters. The invention was jointly patented with the MoD Electronics, Logistics and Property Management Company – MoD. ED Co., (Hungarian patent number P0800248). The research and development work resulted in a sorbent material that has an enormous specific area and hence is able to remove the arsenic content of waters much more efficiently than any of the known technologies today. **Do to its unique structure and composition the new sorbent material can remove the organic arsenic content of the waters as well.** Arsenic containing adsorbent particles do not re-enter the water. The technology can be implemented easily in both industrial and domestic scales.

Production technology of the sorbent material is not expensive and consists of just a few chemical and physical steps. The support material of the special nano-scale adsorbent is produced by carbonization of agricultural by-products. According to the experiments, using the new sorbent **arsenic content of a water with a 20-30 µg/l initial arsenic content can be reduced down to less than 0.2 µg/l (0.2 ppb)**, which is around the detection limit of arsenic and is definitely much lower than the strict official 10 µg/l concentration limit. Resulting from the outlined advantages, the new sorbent material is suitable for the dearsenification of drinking waters on both industrial and domestic scales using the flow-through adsorption technique.

If You are interested in the technology or want to buy sorbent material please contact one of the companies below.



Developer and manufacturer of the sorbent material:

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