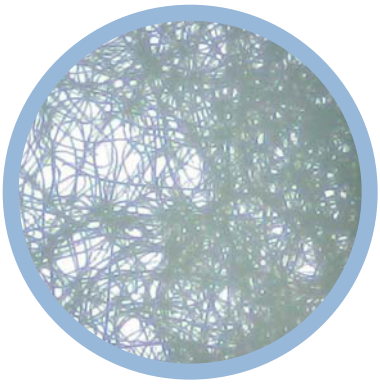
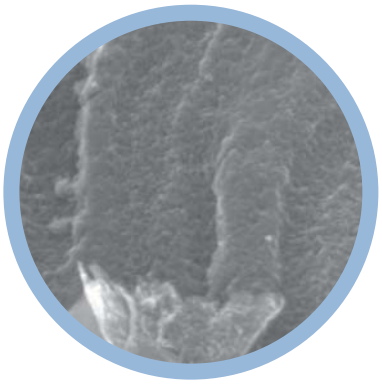
Polymer Institute, Slovak Academy of Sciences
http://www.polymer.sav.sk

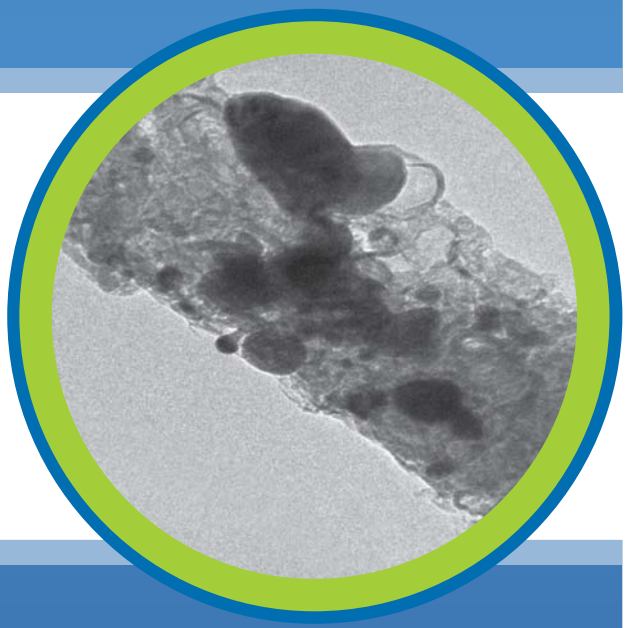
Water Research Institute

POWERFUL COMPOSITE SORBENT

- Composite sorbent for the removal of contaminants from water
- High removal efficiency of heavy metals: **arsenic** 97,8%, **antimony** 97,6%, **chromium** 96,4%, **cadmium** 88,9%, **lead** >98,9%
- Low price achieved by using input raw materials from plant wastes
- Up to **163%** more effective than commercial products; according to the type of contaminant







- Applications
  - in the treatment of water for drinking purposes
  - in the treatment of wastewater from the chemical and electronic industry

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PURPOSE OF USE AND BRIEF DESCRIPTION

Polymer Institute of the Slovak Academy of Sciences has developed and Water Research Institute has successfully tested a composite sorbent for the removal of contaminants from water. These are mainly heavy metals - As, Sb, Cr, Cd, Pb and others.

The developed composite sorbent is significantly more effective than the top commercially available sorbent, often several times. In laboratory tests residual concentrations of heavy metals were achieved that comply with the limits for drinking water.

As the basic input material for the production of the sorbent cellulosic precursors, produced annually in billions of tons by the nature, are used. This results in a low cost of the sorbent.

An extensive use of the composite sorbent is assumed also in areas, where exists a problem with the contamination of drinking water, such as several countries in Asia. These are often areas where the input material poses a waste and by that an important ecological load on the environment. The composite sorbent can be also used in wastewater treatment, including wastewater from chemical and electronic industry.

The developed composite sorbent is prepared by controlled carbonization of fibrous cellulose raw materials and the resulting nanoporous carbon fibers are modified with hydrated iron oxides entrapped in the pores and on the surface of the fibers. The original molecular structure of the sorbent facilitates the achievement of a synergy effect of carbon and iron oxide, and provides not only a high efficiency but also a high rate of contaminant capture. The physical structure of the composite sorbent reduces the resistance to water flow, and its efficiency in removing contaminants is in the area of practical applicability independent from water pH.

TECHNICAL PARAMETERS AND PROPERTIES

Main physical properties of nanoporous carbon fibres:

Length:	20 µm to several cm
Diameter:	10 to 50 µm
BET surface area:	several m^2/g to almost 2000 m^2/g