

# Laboratory of Physical Chemistry

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## 1) Development of new technologies for removing toxic substances from water and soil

- mineral and carbon sorbents preparation
- modification of sorbents by iron nanoxides (magnetic sorbents)
- magnetic filtration of nanoparticles
- utilization of biomass for the preparation of activated carbon
- elimination of xenobiotics (heavy metals, pesticides, organic dyes) from water

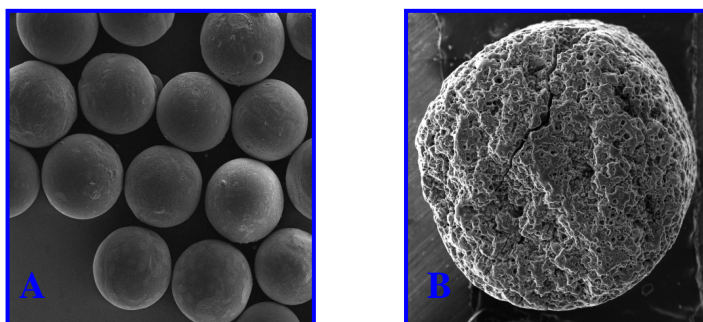


Figure 1: Active coal before (A) and after modification (B).

## 2) Application of microwave field in the treatment of raw materials and biomass

- microwave-assisted leaching of ore and waste and microwave-assisted vitrification of waste
- study of the dielectric properties of materials
- microwave modification of the magnetic properties
- microwave-assisted extraction of organic compounds from coal and biomass
- testing of chemical and mechanical stability



Figure 2: Microwave heating of materials (A), direct heating in a microwave oven (B), and siderite after microwave heating (C).

## 3) Mineral processing

- sample preparation (crushing, grinding, screening, classifying)
- magnetic and electrostatic separation
- minerals beneficiation in hydrocyclone (ores, coal)
- study of mineral liberation influence on the separation process efficiency
- optimization of separation parameters
- study of the magnetic properties
- elemental (CHNS) analysis
- microwave, induction and tubular heating for samples processing
- contactless measurement of temperature

Figure 3: A - talc with pyrite, B - cassette of magnetic separator

