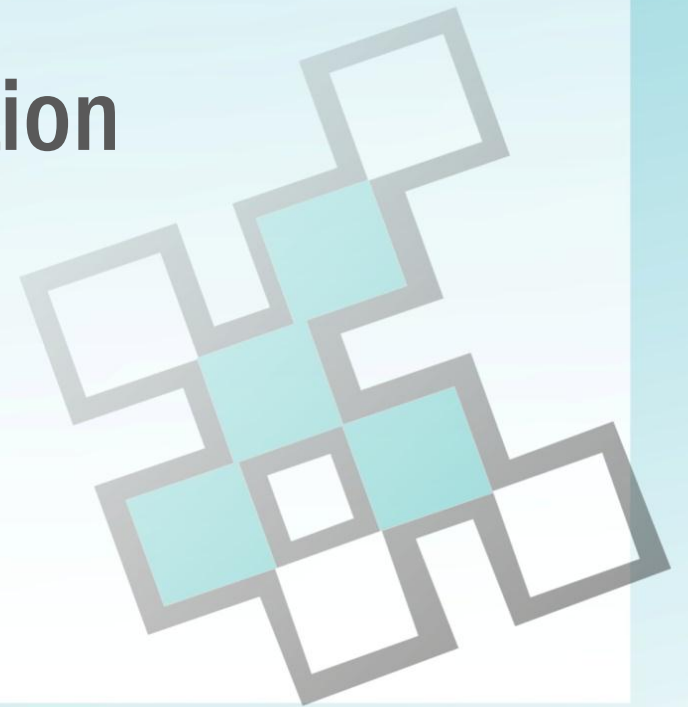
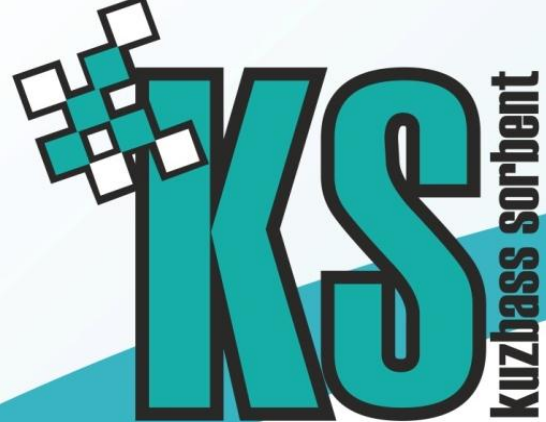




Company "Sorbents of Kuzbass"
Production of carbon sorbents for
gas separation,
air and water purification

Kemerovo, Russia





«Sorbents of Kuzbass» LLC
resident of the Skolkovo innovation center and
Coal chemical cluster of Kemerovo region, part of
Technology platform "Technology of production and use
of hydrocarbons" and "Technologies and materials of metallurgy",
has experience in fulfilling orders for R&D. Our customers:



F A S I E



The use of the company's products



Water treatment



Air and gas purification



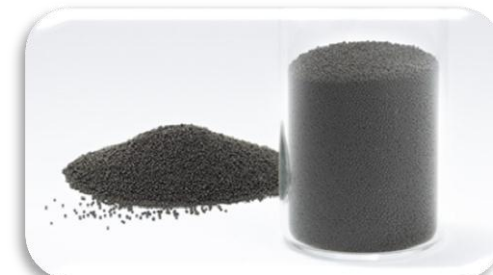
Supercapacitors



Gold recovery



Pressure Swing Adsorption and water purification plants



Catalysts carriers



Food and beverage production



Industrial chemical processes



Natural gas storage



Personal respiratory protection, filters

Applicability

Russia produces less than 50% of activated carbons for water purification and does not produce carbon sorbents for separation and purification of gases, gold extraction. Russian market is 25 thousand tons/year, 4 billion rubles (Freedonia Group)

As a result:

- Dependence on foreign suppliers of sorbents and active carbons (and their prices)
- The need to reduce the cost of water and gas purification
- Complex logistics and lack of service for the replacement and disposal of sorbents, long delivery time



Our company offers cooperation in the following areas:

- Sorbents and plants for sorption purification of waste gases (H_2S , CO_2 , NO_x , CO_x , SO_x , HCl , NH_3 etc.) at oil and gas, chemical, metallurgical plants, thermal power plants
- Wastewater purification from organic matter, sorption of metals from solutions, gold recovery
- Purification of amine solutions (MDEA) at gas processing plants, refineries, chemical plants
- Coal mine methane concentration for processing
- Creation of mesoporous sorbents and catalysts such as "palladium on carbon" or "platinum on carbon"
- Regeneration of activated carbons



1) Activated carbons and waste gas sorption purifying plants (H₂S, COS, NO_x, CO_x, SO_x, NH₃, HCl, CH₄, H₂, etc.)



- They are used to capture hydrocarbon vapors with subsequent return to production
- Allow to purify ventilation emissions from H₂S, COS, NH₃, NO_x, SO_x, CO, CO₂, HCl, Cl₂ with the possibility of subsequent regeneration of sorbents
- They are used for purification of coke oven gas, fuel gases of ammonia production, separation and purification of gases: N₂, O₂, H₂, He, Ar, CH₄, CO, CO₂
- Allow to absorb precious metals in ventilation emissions of refineries with the possibility of subsequent recovery of precious metals



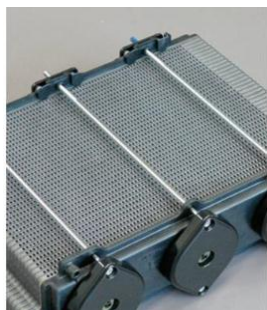
2) Wastewater purification and sorption of metals from solutions

- Mesoporous carbon sorbents are effective in purifying of effluents from organic and inorganic substances, suspended particles, sorption of metals from solutions, including precious metals
- Activated carbon of 000 "Kuzbass Sorbent" has a high strength, which allows you effectively using it in large filters design and regenerating it
- The company "Kuzbass Sorbent" can take care of the service for the regeneration of activated carbons with its equipment, which will allow **reducing the cost for sorbent by 50%**



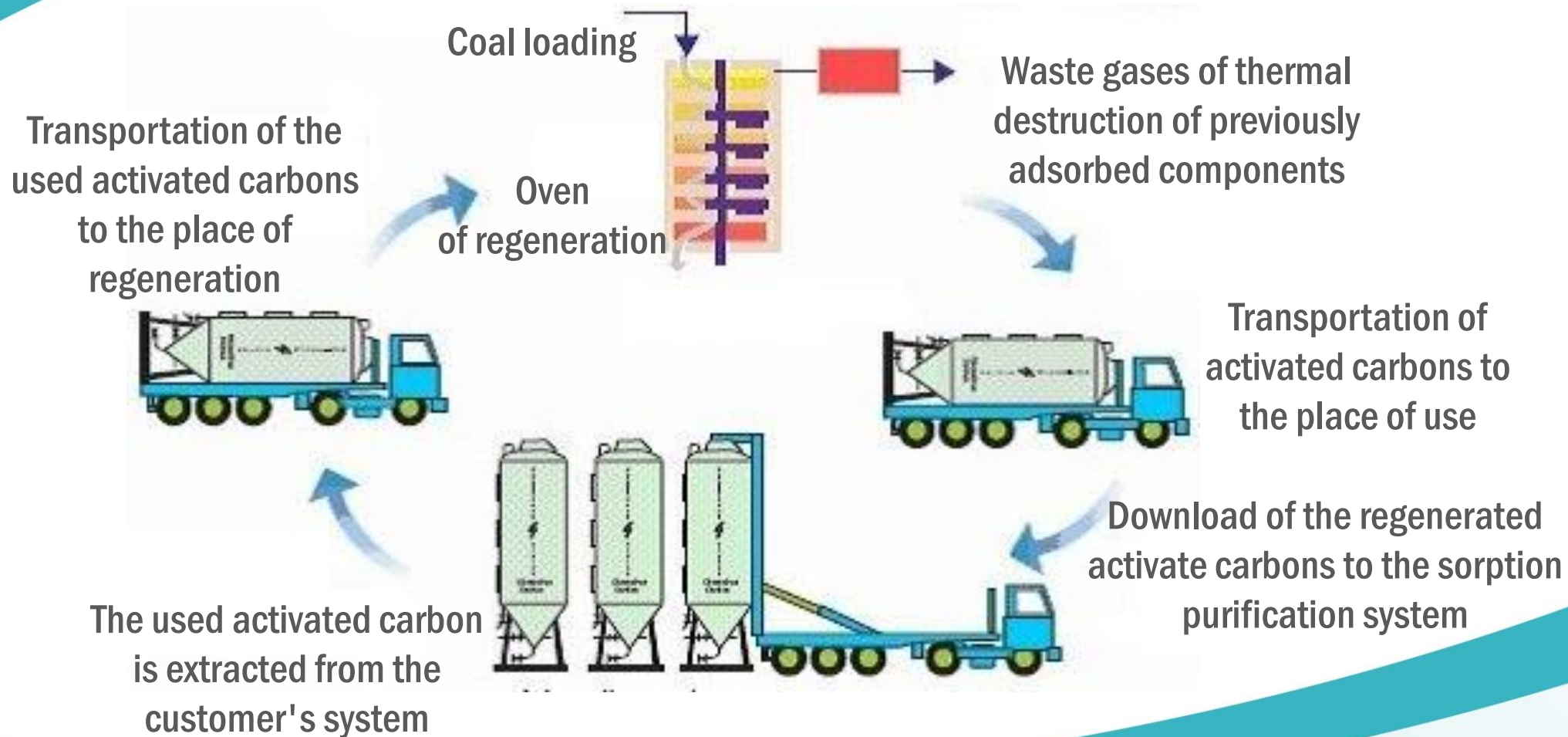
3) Modification of sorbents by metal nanoparticles for the use in gas purification and powers sources.

- Modification of porous carbon materials (sorbents and fibers) with metal nanoparticles (Cu, Fe, Ni, Pt, Pd) will allow changing their sorption, electrophysical properties and using them more effectively:
 - as sorbents and membranes for purification of hydrogen and natural gas, capture of CO₂, CO₂, nitrogen oxides (achieved capacity increase by 7-10 times)
 - As hydrogen accumulation materials for the manufacture of fuel cells
 - As materials for RPE or accumulators



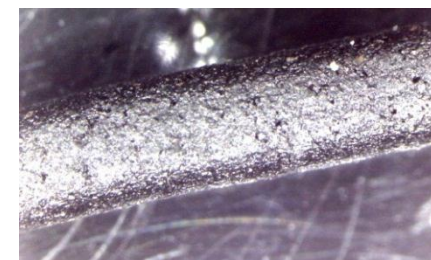
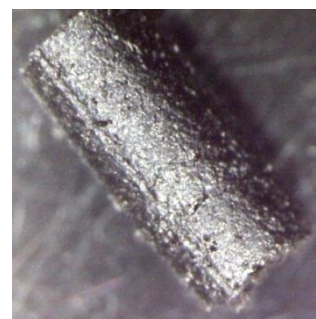
4) Services on regeneration (restoration of properties) of the used activated carbons

Regeneration cycle



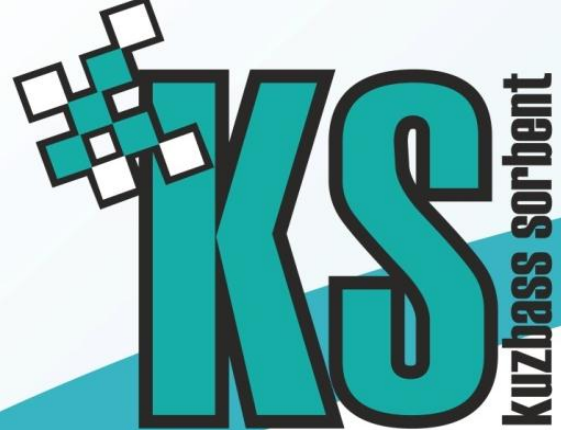
PRODUCTS

Granulated and powder activated carbon and carbon molecular sieves	
Parameters	Indicator
Granules' size:	1-3 mm
Mass fraction of moisture	Not more than 2 %
Pore space by water	0,5-1 cm ³ /g
Mass fraction of ash	Up to 10 %
Bulk density	0,45-0,6 g/cm ³
Abrasion resistance, ASTM	85-99 %
Activity by methylene blue	150-320 mg/g
Activity by iodine	85-110 %
The cost of 1 ton	160 thousand rubles without VAT
Warranty shelf life	Not less than 12 months



COMPETITIVE ADVANTAGES

Competitors	Analogues	Our competitive advantage
Osaka Gas Group, Japan	Activated carbon, type Kureha for gas and water purification	Price factor The cost of activated carbon is 70% lower. Higher strength – longer service life
Carbotech GMBH, Germany	Carbon molecular sieves - CMS for H ₂	Price factor The cost of CMS is 2 times lower. Wider range of sorbents for H ₂ , air purification
Calgon Carbon Corp., USA	Norit and Chemviron activated carbon for water CMS for CH ₄ , H ₂	Price factor The cost of activated carbons and CMS is 2 times lower. Higher performance and mechanical strength



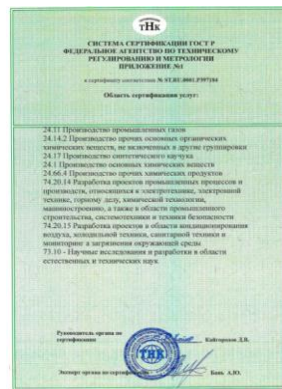
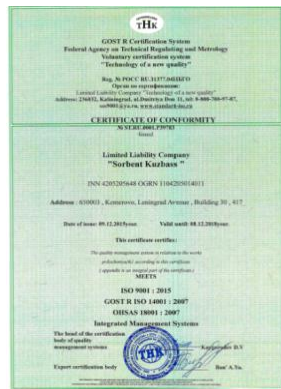
CERTIFICATION

The company has 4 patents of the Russian Federation, certificates QMS ISO: 9001, 14001, OHSAS 18001, TU and GOST R certificates for 6 types of products and services

Company



Product



PROJECT TEAM

The company has 10 employees, there are foreign consultants with experience in attracting investments, implementing projects and government orders (RAS, RFBR, Ministry of Industry and Trade of the Russian Federation, Atlantic Research Corp., commercial companies)



- **A. V. Berveno**, Director, work experience 13 years, chemist - KemSU, management – HSB TSU. 101 publications, 4 patents. Attracted 75 million rubles, agreements with TVEL Group of companies, Skolkovo Foundation, Rosnano, Innovation Fund, agreements with 50 customers.



- **V. P. Berveno**, Director of Science, work experience 45 years, chemist-engineer - KuzSTU, more than 150 publications, 6 patents, Ph. D. in Chemistry, senior research scientist, work experience in Koks, VostNII, Institute of Solid State Chemistry and Mechanochemistry of SB RAS, project management with the Ministry of industry and Trade of the Russian Federation

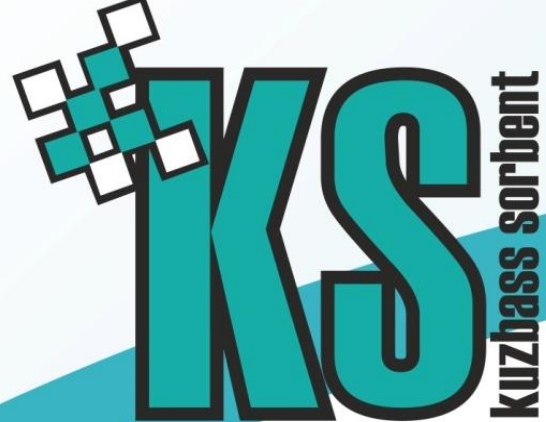


- **A. Y. Bessogonov**, , Chief Technologist, work experience in designing 48 years: PAO "Koks"

- **T. G. Sheikina**, Head of Laboratory, in charge of the factory laboratory for 25 years

- **E. A. Ustinov**, Scientific Consultant, experience 45 years, senior research scientist of Ioffe Institute of RAS, Prof. of the University of Queensland (Australia), 165 publications

- **V.A. Poluboyarov**, Professor of NSTU, Doctor of Chemistry, senior research scientist of Institute of Solid State Chemistry and Mechanochemistry of SB RAS, head of the group of methods of dispersion-composite hardening of metals



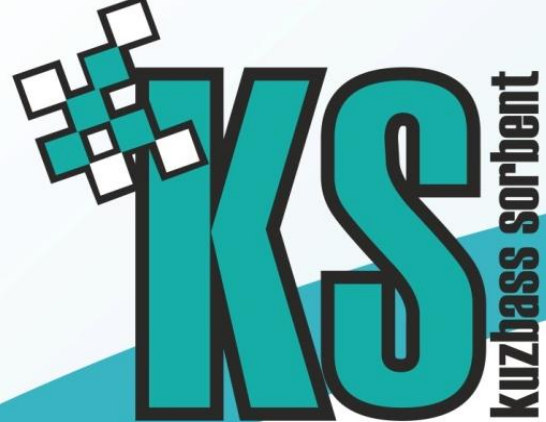
We will be happy to cooperate with you!

Director of OOO "Sorbents of Kuzbass"
Alexander Berveno

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E-mail: sorbkuz@mail.ru, <http://carboncenter.ru>

PRODUCTION SITE OF «ООО «SORBENTS OF KUZBASS» LLC

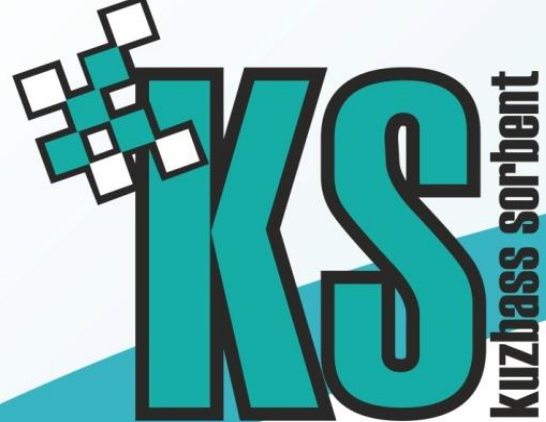




Products of the company "Sorbents of Kuzbass" is used:

- In mechanical engineering and energy industry
 - Production of plants for separation and purification of gases
 - Manufacture of equipment for CO₂ extraction from flue gases
- In chemistry, coke chemistry and metallurgy
 - Separation and purification of gases: N₂, O₂, H₂, He, Ar, CH₄, CO, CO₂
 - Processes of production of ammonia fertilizers
 - Separation of coke oven gas processing products
 - Ensuring of explosion and fire safety
- In the petrochemical industry
 - Natural gas purification, storage and transportation
 - Separation, purification of methane conversion and reforming products, natural gas and APG processing products
- In gold mining





Products of the company "Sorbents of Kuzbass" is used:

- In coal chemistry
 - Production of plants for separation and purification of gases
 - Gasification of carbons and anthracites
 - Manufacture of RPE (self-rescuers, gas masks, respirators)
- Concentration and removal of methane from coal mine spaces, increase of methane concentration for further use in cogeneration plants, ICE, production of gas motor fuel
 - In the paint and food industry, medicine
 - Creation of inert environment when packaging of products
 - Purging of technological equipment
 - Transport and aviation
 - Manufacture of batteries and supercapacitors
 - Air conditioning in the car
 - Filters for emissions purification

