

Alexandr Mirgorodskiy  
T.S. Savelieva, research supervisor  
L.O. Tokar, language adviser  
SHEI «National Mining University», Dnipropetrovsk

### **High-gradient Cryomagnetic Separator**

High-gradient magnetic separation in strong magnetic fields produced by superconducting windings is effective and economic process. To compare with other methods it is less power-intensive, and is more productive in terms of equipment mass unit.

High-gradient cryomagnetic separator with high magnetic field strength serves to concentration of weakly magnetic minerals which grain is 0,01-1 mm.

Analysis of techniques of lowering emissions of sulfides by thermal plants shows that flue gas purification by means of chemical and catalytical methods can not be optimum from both commercial and environmental point of view. Use of purified coal is more efficient.

That is why clean technologies of primary desulphurization and deashing thermal coal, metallurgical coal, and water-coal fuel are single source.

Included in processing line of coal benefaction the equipment performs deep purification of coal and coal waste without use of any flotation agents.

Purifying coal, high-gradient cryomagnetic separator extracts more than 90 per cent of pyrites sulphur, and up to 40-60 per cent of other ash-forming additions. With it, its efficiency is 30 to 60 tonnes per hour, and energy input is not more than 15 to 20 kW.

Thanks to extremely high magnetic field strength combined with steep field gradient within separation area the device can be used and is used beside purifying pulverized coal fuel for the following:

1. Separation of feebly magnetic ores: nickel, manganesian, chromium, molybdenic, uranic, tungstic, auriferous ores, and ores of rare earth metals.
2. Purifying kaolins, bauxites, graphites, refractory, talc, magnesite, calcium carbonate, dolomite, feldspar, and purifying sands for glass industry and ceramics industry.
3. Treatment of process water and recirculated water from roll mills and APSs.
4. Purifying catalizator polluted sinks of chemical producing units.