

*Materials of Conferences***THE GOLD – COPPER – MOLYBDENUM – PORPHYRITIC DEPOSITS EXPLOITATION POSSIBILITY**

Burdin N.V., Lebedev V.I., Lebedev N.I.  
*The Tuvinian Institute of the Complex Development  
of the Natural Resources of CO  
of the Russian Academy of Sciences (RAS), Russia*

To the number of the most significant tasks, having provided by the social and economic development Strategy of the Tuva Republic for the period up to 2020, and having demanded the immediate solution, are regarded: the scientifically substantiated guidelines development on the mineral and raw materials sources rise of the noble metals; the efficient geo – technologies and the concentrating apparatuses creation for the gold extraction for the purpose of the gold – mining multiple volumes gain in the region. All these tasks are being decided by the TuvICDNR CO RAS staff in the process: the specialized prognostic and metallogenic explorations conducting on the exposure in the known Tuva's districts gold – mine deposits, which are the perspective ones for the Au – Hg – argilliferous, Au – berezovite and Au – carbonaceous – sulfide formations on the industrial ore objects exposure; the designed efficient processes introduction of the small and fine – dispersed gold and the secondary constituents industrial extraction from the oxidized and semi – oxidized ores. It is necessary to emphasize, that the maximum accessible degree of the gravitational small, fine and dispersed fractions extraction of the noble metals without the environmentally dangerous chemical agents use, has, as usual, been left one of the most complex challenges in the economic efficiency rise at the ore deposits mining. At the first stage, the research engineering works and the development activities have been done, having had the purpose of the experimental installations creation for the parametric characteristics estimation of the heavy particles travel into the pulp's flows, having the different density. The minerals and the metals distribution of the raised specific gravity takes its place at the restricted fall in the heavy medium, and also in the vortex and upward streams, in the centrifugal field and so on. The Institute has continued the research engineering works and the development activities, having oriented to the centrifugal and vortex principle use of the mineral raw materials enrichment with the heavy thin metals concentration, the minerals with "the funnel effect" use and the others, at the same time, with successful tests of the tray – type concentrating apparatuses of the various efficiency. The «Kzyk – Chadyr» deposit ores enrichment process half – industrial tests (The Table 1) have been carried out with the 5 tonnes initial ore processing at the TuvICDNR CO RAS at the testing ground by the manufacturing scheme.

The ore test material constitution study has been carried out with the spectral, chemical, granulometric and also mineralogical analysis methods use. The obtained data are testified to, that the main industrial ore's value is defined by the gold, the content of which is made up 14,6 gr./ton. 9,2 gr./ton. silver, and 4,3 % copper are present among the other secondary valuable constituents in the ore. The thin and the scattered elements are contained in the quantities, which are not quite presented the industrial interest. The sulfide sulfur content is made up 0,42%. The presented results have been shown, that the gold great bulk (e.g. 93,5%) in the ore is found just in the free form; the 5,3% gold is present in the splices; a little more 1% gold is connected with the copper oxides and sulfides; the 0,1% gold is consisted in the quartz. The initial ore particle size analysis with the above – mentioned constituents content definition just in each class has been carried out for the purpose of the gold and the silver distribution study by the size classes. The gold great bulk (e.g. 99,1%) and the silver great bulk (e.g. 94,6%) have been concentrated in the large and the medium classes in the range from 0,074 mm and higher. In these classes – 0,074 mm are found about 1,5% gold and 5,4% silver. The quartz is found the predominant mineral in the engineering test material, by the given data of the semi – quantitative mineralogical analysis. The chlorite, the sericite, and also the calcite, the ankerite, the dolomite – in the singular granules and in the not numerous splices composition are present just in the non – metallic part of the test. The quartz is also, mainly, registered just in the splices composition, but the sulphides, the malachite, and the chlorite are observed in the less quantity. Thus, the copper sulphides – the chalcocite or the copper – glance, the chalcopyrite and the others are the main ore minerals. The sulphides, in the form of the very thin and sparse dispersion, are observed in the quartz and in the chlorite.

The mechanical tray – type lock has been inserted into the equipment layout, for the purpose of the technological process kinetics rise, in order to extract the valuable heavy constituents, as much as possible, in the relatively quiet weighed medium. This method is included the initial material preparation, having contained the clay quantity in the classification process and the dilution on the sieve by the sizing movement and by the water atomizers, the pulp transportation along the platform, having consisted in the enrichment chambers cascade. The enrichment every chamber's working surface is consisted in the plane surfaces of the Siberian tray, the conical surface of the Korean tray, the cylinder's internal surface, having fastened on the plane bottom and with the fastened on the bottom by the second cylinder, having the concentric external surface and with the sprinkler attachment. The platform is subjected to the circular movement.

The pulp is subjected to the centrifugal forces influence for the fine fraction pressure to the conical underlying surfaces, at the getting into the flushing trays deepening. The inclined platform has the box – type wall construction, which are the hammer – stones and the supported member for all the units. The concentrate is come through the hose into the capacity, having designed for the concentrate collection, and having had the branch pipe. The vibration amplitude and frequency is regulated by the imbalance selection and also by the electric motor’s number of revolutions. The drive mechanism can be also made in the form of the eccentric mechanism, having installed, motionlessly, on the basis of the platform mounting. Thus, the received concentrate is thrown over the branch pipe to the bottom of the tray with the upward current [1], which has been brought closer to it.

The pulp slime removal and the heavy fractions concentrations have been carried out on the centrifugal and vortex slime removal mechanism [2]. The solid phase deposition on the conical surface of the separator body of the lower part with the continuous passing to the discharge hole of the sanding nozzle at the constant washing out just from the light mud fraction by the pulp of its liquid part takes its place under

the centrifugal forces influence. A part of the dehydrated small particles is caught just on the conic motionless lower part of the separator body for the subsequent extraction, as the thickened product through the branch pipe with the sanding nozzle. The pulp of its liquid part just after the circulation by the walls of the separator’s bowl is displaced through the vortex bleed funnel with the downcomer by the center at the expense of the forced energization and also the water by means of the blades, having fastened to the external side of the separator’s bowl for the untwisting and the initial raw materials pushing downright with the pulp vortex flow formation. For all this, they are receiving the thickened product in the form of the fine and thin small particles of the sanding fraction with the small particles of the valuable constituent, having washed out from the clayey fine small particles, having contained in the initial raw materials. The sanding fraction is received to the centrifugal and vortex concentrator, which is related to the field of the wet separation of the specially fine and thin small particles by their density. This method and the apparatus are permitted efficiently to catch the especially fine and the dispersed small particles of the heavy minerals and the metals. [3,4].

**Table 1.**

Product	Output, %	Content, gr./ton.		Extraction, %		
		Au	Ag	Au	Ag	Cu
Gold Head	0,043	25940,46	8729,3	76,4	40,8	16,3
Gold & Copper <u>к-т</u>	0.561	593,37	826,52	22,8	50,4	63,9
Tailings	99,4	0,12	0,814	0,8	8,8	19,8
Initial Ore	100	14,6	9,2	100	100	100

The gravitational enrichment results of the «Kyzyk – Chadyr» deposit ore have been given in the Table 1. The concentrate just from the centrifugal and the vortex concentrates are received for the supply to the concentration tables. The two concentrates – e.g. the gold head and the gold and copper concentrate have been received. The common extraction into the concentrates are equal to: Au – 99,2 %, Ag – 92,0 %, Cu – 80,2 %. It is recommended the above – described the manufacturing scheme of the «Kyzyk – Chadyr» deposit ores enrichment, by which the gold, the silver and the copper extraction high indices have been provided, in the result of the carried out semi – industrial tests of the ores processing technology. The gold, the silver, and more 50% of the copper of the large quantity are contained just in the received gold and copper concentrate that is permitted to relate this concentrate to the copper concentrates of the highest KMO trade mark (the State Standard Specification 48 – 77 – 74). Their leaching is quite economically unreasonably, having judged by the gravitation tailings.

**References**

1. Burdin N.V., Lebedev V.I., Chadamba P.V., “The Mechanical Tray – Type Lock and the Heavy Minerals and Metals Enrichment Method”. / The Patent of the Russian Federation № 2147934. M.: The Russian Agency on the Patents and the Trade Marks. – Bulletin № 12, 2000. – p. 14;
2. Burdin N.V., “The Pulp Slime Removal Method and the Device for Its Realization”, / The Patent of the Russian Federation № 220923. M.: The Russian Agency on the Patents and the Trade Marks. – Bulletin № 21, 2003. – p. 14. Burdin N.V., Grebennikova V.V., Lebedev V.I., Burdin V. N. / “The Devices, Color Minerals, Metals Gravitational Extraction Technologies and the Bio – Ecology Problems”. / «The Color Metals» Journal №3. 2008, p.p. 38 – 42;
3. Burdin N.V., Lebedev V.I., / “The Fine Gold Gravitational Extraction Technology”, «The Ores Enrichment» Journal №1. 2008, p.p. 13 – 15;
4. Burdin N.V., Lebedev V.I., “The Heavy Minerals and Metals Enrichment Method and the Centrifugal and Vortex Concentrator for Its Realization”. /

The Patent of the Russian Federation № 2210435. M.: The Russian Agency on the Patents and the Trade Marks. – Bulletin № 23, 2003. – p.10.

The work was submitted to international scientific conference «Innovation technologies», Thailand – Cambodia, February 18-28, 2009. Came to the editorial office 26.01.2009

**THE PERSPECTIVE INFORMATION  
TECHNOLOGIES EFFICIENT REALIZATION  
AT THE GRAPHICS PERFORMANCE FOR  
THE MEAT SYSTEMS COMPONENTS  
SIMULATION**

Kovalev A.S., Shalimova O.A, Antziferova N.I.,  
Kirillova L.P.  
*Orlov State Agrarian University  
Orel, Russia*

The “Microsoft Windows 7” perspective operating system (OS) arrival has become a new step in the realization efficiency rise of the profiling new graphics models of the force – meat structure. The new operating system (OS) is distinguished by the high reliability, the large – scale productivity, the advanced graphical interface, and the advanced operation facilities, as in the global area, well as in the local area networks (LANs).

The application of the 64 – bit computations in the “Windows 7” operating system (OS) is permitted to use a more 4 gigabit main memory, owing to the “Core i7” platform by three exchange channels (DCC) on the basis of the 45 – nanometer technological process of the DDR3 type. The conversion to the parallel computing is practically provided the following core sets expansion in the computer processors. The new generation programs of the “Windows” operating systems (OS) are optimized the multi – nuclear computer processors possibilities (e.g. 2–, 4–, and 8 – nuclear ones). It is expected the following expansion from 16 up to 64 cores sets in the computer microprocessor in the near – term outlook. So, it has been obtained the PC higher productivity of more, than four teraflops

(TFLOPS) at one graphics processing unit (GPU), and 240 data flow processors, having the 16 gigabytes memory capacity, on the basis of the “Nvidia Tesla” computing systems, and without the main computer processor operation.

The “Core i7” new generation chips of the 45 – nanometer technology on the basis of the “Nehalem” micro – architecture with the built – in memory controller into the processor have increased the operation velocity of the main memory for 50 per cent that resulted in the computer power has been increased for two orders more. The “Nvidia GeForce GTX 280” graphics card, at the multi – data flow processors and one gigabyte display memory on the frequency of 1,296 megahertz, has provided the graphic presentation efficiency of the rheological and structural profiles of the meat system for 50 per cent higher, than at the present “Nvidia GeForce 8800” graphics card on the basis of the “GT 200” new graphics processing unit (GPU), having performed by the 65 – nanometer technological process.

These graphics cards of the high definition (XHD) on the wide screen monitor within the ultra-high resolutions are being provided in 7 times brighter and more sharp presentation image of the meat profiles and the histological sections, in comparison with the screen monitors, having their less resolution, and they are printing in 2 times more sharp image, than at the displays of the existing park.

The “NVIDIA CUDA 3” technology is being opened all the possibilities of the GPU main core sets, thus, having accelerated the most exacting system tasks, for example, the video conversion, and, having provided almost the sevenfold increase in productivity, in comparison with the traditional GPU.

The “NVIDIA HybridPower 5” technology is provided automatically to switch from the “GeForce GTX 280” graphics card to the “GeForce” graphics processing unit (GPU), which has been integrated into the system board, in a case of its operation with so called “not difficult” graphics applications. This operation is, practically, resulted in the noise reduction and also the considerable energy conservation.

**Table 1.** The “GeForce GTX 280” Specifications

Data flow processors	240
Core set frequency (MHz)	602 MHz
Shader unit frequency (MHz)	1296 MHz
Memory frequency (MHz)	1107 MHz
Memory capacity	1G
Memory interface	512-bit
Memory bandwidth (Gb/sec.)	141.7
Textures mapping velocity (bln./sec.)	48.2

The «Super Speed USB 3.0» new technology has been provided the graphics files communication of the time history image of the functionally and technological parameters of the meat systems between the peripheral units and the computer, having memory ca-

capacity more, than 30 gigabytes, in 10 times fastly, than the “USB 2.0”, which is now existing. For all this, the maximum data transfer rate (DTR) on the biochemical – and functional –, and technological parameters of the meat product at the “USB 3.0” application, simul-