In conditions of permafrost the industry of building practices a construction of buildings with cold and ventilated cellars. According to the institution of permafrost study SB RAS, the presence of cellar, the temperature of which will be much higher than the temperature of outer air, allows [3]:

1) to decrease the infiltration of air through the basement floor of building, which cause uncomfortable temperature regimen of the first floors' surface;

2) to improve the thermal resistance of the building;

3) to cut down the costs of heat insulation of building' basement part.

In consideration of all these factors, it's reasonable to revive the experience of construction the buildings with warm cellars at the new, industrial level.

For the preservation of permafrost condition of soil bases, mainly, at the individual building there are used band ferroconcrete foundations with ventilated cellar. But in such houses and in houses at piles the temperature regimen of floor is rarely followed, it is usually cold because of insufficient provision with heat insulation and hermetic encapsulation of floor construction. Therefore by decision of scientifically-technical council of the Russian Federation State Committee for Construction, Architectural and Housing Policy in 1994 there was published «The album of technical decisions of basements and foundations of village and settlement building at permafrost soils» [4].

The ways of arrangement of foundations and technical solution to foundations in work [4] were developed for buildings with width more than 9 m when using permafrost soil bases at permafrost condition during the construction and exploitation (principle I by Construction norms and rules 2.03.04–88), for buildings with width less than 9 m – at thaw out condition (principle II by Construction norms and rules 2.02.04–88). Thereby for relatively homogeneous solid permafrost bases of buildings and constructions of small width (to 9 m) there is admitted the thawing of bases at the process of exploitation subject to use of foundations, which are able to take uneven settling (slab, cross bands etc.).

Technical decisions of basements and foundations can be used for bigger nomenclature of dwelling houses, public and industrial buildings without sufficient completion on conditions that constructions, materials and temperature regimens of overground parts are identical, and the width of object according to plan do not exceed designated limits.

An author of these article has used and studied the technical decisions given at the album [4] when building a number of experimental objects: in 2000 – the individual house out of beam; in 2002 – the village school for 80 seats; 2009–2012 – wooden frame houses [5], with the use of developed multilayer constructions of wall fences and items at the base of power efficient materials out of local raw materials [6–8].

The account methods of buildings' basements and foundations on the permafrost soils at the operating normative documents rely on empirical dependence and do not take into consideration the changes of temperatures and processes of heat-mass exchange in conditions of exploitation. Nowadays the possibility of more accurate account of soils' temperature field in buildings' basements with the use of increased capacities of computer engineering and wide development of mathematical modeling methods has appeared. It has become possible to develop numeral models with great degree of detail and exactness, which take account of the majority of determinative factors of soils basement buildings' heat exchange. Therefore for the explanation of trustworthiness of developed mathematical account models we carry out surveys on location of temperature regimen of experimental houses' soil bases.

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The work is submitted to the International Scientific Conference «Science and education in modern Russia», Russia (Moscow), on November, 20-22, 2012, came to the editorial office on 26.11.2012.

RESOURCES OF PRECIOUS METALS IN TECHNOGENIC OBJECTS OF MINING AND METALLURGICAL COMPLEX OF RUSSIA

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At present, global reserves of platinum group metals (MPG) include over 100 thousand tons. Three large ore areas share about 90 % of them: Bushveld (South Africa), Norilsk (Russia) and Great Dayka

(Zimbabwe), thus the main production of MPG is carried out from raw materials of ore fields of the Republic of South Africa and Russia [1].

The most important aspect of the sustainable development of the Russian platinum complex and strengthening its position in the world market of MPG is expansion and restructuring of platinum metals mineral base. Russia has a powerful potential to increase resources and stocks of the platinoids because of involving in processing technological wastes of polymetallic ores. All of the large global manufacturers of MPG possess technogenic objects of the various importance, but only the largest technogenic platinum fields are connected with the Russian mining and metallurgical complex [2].

As additional sources of platinum metals in Russia it is expedient to consider tails of enrichment of sulphidic copper-nickel ores, stored pyrrhotite concentrates (LPK); stored magnetite concentrates and dumps of dusts and slags of mining-metallurgical company Norilsk Nickel (NN), and also technogenic platinum-chromite scatterings of the Urals and Aldan.

Norilsk technogenic deposits. In NN MMC significant loss of platinum metals (20%) are related to the enrichment of the primary sulphide copper-nickel materials. Application of the developed concentrating flow sheets with a wide range of operations (gravity, enrichment in heavy suspensions, flotation, etc.), focused mainly on the concentration of non-ferrous metals, a large amount of roughing operations and, accordingly, the formation of significant amounts of semi-products, in various degree of containing MPG, leads to irrevocable technogenic dispersion of noble metals.

In a metallurgical cycle of processing of sulphidic concentrates of non-ferrous metals the main part of platinum metals are collected by anode slimes of electrolysis of copper and nickel. In NN MMC processing of slimes is carried out on the technologies providing receiving rich platinum concentrates, meeting requirements of refining production. MPG losses in a metallurgical cycle are estimated at 3-5% and are connected mainly with dump slags and dusts of melting and roasting processes. It should be noted that partial return of semi-products formed in primary production leads to circulation of part of platinum metals in a production cycle.

In NN MMC more than 300 million tones of the dry platinum industrial waste representing a perspective source of noble metals has been accumulated whereas the reduction of part of rich ores in the commodity mass of Norilsk deposits leads to the decreasing volume of a domestic production of MPG [1, 2].

Norilsk technogenic platinum deposits has been accumulated within several decades in processing of rich sulphidic copper-nickel ores. Formation of technogenic mass of the Norilsk industrial region is accompanied by course of the active geomechanical processes that determine the conditions of migration of noble metals and their redistribution. Set of these processes in combination with other natural and technology factors defines two tendencies in formation of technogenic fields of MPG – migration of platinum metals in products of a technogenic complex and their localized concentration promoting the emergence of extremely rich zones on platinoids.

Storage of dump products of enrichment and metallurgical production is characterized by low orderliness of storage and mixing of polytypic products (dumps of discarded ores and overburden, tails, slags, dusts, stored pyrrhotite concentrates, ground precipitations of ponds stores, etc.) that was especially shown at the first stage of functioning of NN MMC when processing rich sulphidic ores, and later pyrrhotite ores.

Tails of concentrating factories. The MPG expected resources of tails of concentrating factories exceed 800–1000 t. The largest of Norilsk technogenic fields is the tailings dam of Norilsk concentrating factory No. 1 with an area of 6,2 sq.km with the general stocks not less than 240 million t of dump tails.

The material of the tailings dam is presented by homogeneous mass containing from 0,2 to 5,5 g/t PGM. In the tails remains the same set of platinum minerals as the original copper-nickel ores. Stored tails are characterized by the raised contents of platinum (to 2,1 g/t), palladium (to 5,8 g/t), rhodium (to 0,24 g/t), iridium (to 0,044 g/t), ruthenium and osmium (to 0,01–0,05 g/t), gold (to 1,4 g/t), copper (to 0,8 g/t), nickel (to 0,6 g/t).

Stored pyrrhothite concentrates and iron cakes. Ores of Talnakhsky and October fields are presented by pentlandite-chalcopyrite-pyrrhotite variety featuring a high content (30–60%) of $Fe_{1-x}S$ pyrrhotine. During the flotation of pyrrothite ores it independent sulphidic semiproduct – nickel-pyrrothite concentrate is formed. Because of the relatively high yield and high content of MPG this concentrate represents a unique source of receiving platinum metals, especially rare platinoids which are found only in the form of solid solutions in pyrrhotite and pentlandite.

Depending on the mode of nickel and pyrrhotite flotation in a Norilsk pyrrhotite concentrate it is taken: 13–28% of Ni; 4–6% of Cu; 15–30% Co; 15–30% of the MPG [3]. Chemical, mineralogical and grain-size composition of nickel-pyrrhotite concentrate are defined by the set of initial ores and enrichment conditions. Average contents of iron and sulfur are up to 20–25 and 12–17 tons per 1 ton of contained nickel. Despite significant progress and efficiency of modern methods of autogenous melting, direct processing of such material on matte in the conditions of Norilsk before essential increase of the price of MPG was considered as the unprofitable. Nikel-pyrrhotite concentrate has been stored for many years in tailing dams which are today a serious polluting factor: the firm part is inclined to dusting, and the presence of an artificial reservoir in which the material is treated with flotation reagents, leads to soil erosion, changes in the cryogenic environment and pollution of waste water.

Stored pyrrhotite concentrate consists of very small particles (the maintenance of a class of – 0,045 mm makes 57–95 %) that significantly complicates its processing. It represents a mix of oxides of silicon, calcium, aluminum, magnesium (35–40 %), sulfides of non-ferrous metals (3–6 %) and iron in the form of magnetite (10–15 %) and pyrrhotite (35–45 %). Stored pyrrhotite concentrate contains up to 10 g/t and more PGM, 0,3 g/t of Au, more than 10 g/t of Ag, 1–3 % of Ni and Cu, 0,1 % Co [4, 5].

Total reserves in pyrrhotite storages are about 10 million tons, estimated expected resources of platinum and palladium are more than 100 tons, gold – 3 tons, silver – 100 tons, nickel and cobalt – over 500 thousand tons. Noble metals are disseminated in complex and thin composition of sulphide minerals in the form of impregnations making ineffective mechanical methods of their separation from the rock. In addition, changes in the properties of sulfide minerals during storage greatly reduces the effectiveness of traditional technologies for the processing of stored sulfide materials.

Magnetite concentrates. Perspective technogenic fields of PGM are the storages of magnetitovy concentrates created by processing of rich chalkopyrite ores the Talnakhsky field in 1975. Those years ferroplatinum from these ores wasn't recovered and the maintenance of PGM in dump tails of flotation is 26 g/t.

The dumps of slags and dusts of pyrometallurgical processing. Slag dumps and dusts of systems of dry and wet gas purifications of the metallurgical furnaces are perspective source of noble and non-ferrous metals, saved up in shlakopylevy dumps of NN MMC.

The dusts and gas cleaning waste products are collected by a part of the PGM in pyrometallurgical operations processing of copper-nickel ores. Dusts are represented by small-sized particles of slag, matte and a metallic phase which are formed by the foaming of melts with sparging and oxidation of sulphides. PGM are collected in the metal phase of Fe–Cu–Ni structure, pure iridium and silver, newly formed sulfides, selenides and tellurides of platinum metals, condensates of volatile compounds – oxides of osmium, ruthenium, iridium and silver. Dust scrubbing systems are characterized by higher contents of osmium, ruthenium and iridium from baseline ores dominated by platinum and palladium.

Resources of noble metals (gold + PGM) on a slag dump of Nickel plant are estimated at more than 20 t. The content of metal in slags is extremely uneven.

Overall, the maintenance of noble metals in slag dumps (total content of PGM and Au on various dumps from 1 to 2,2 g/t) and their resources allow to suggest metallurgical slag dump as a potential material, in which except noble metals Ni – 16 thousand tons (content of 0.04 to 0,12 %), Cu – 52 thousand tons (content from 0,2 to 0,37 %) and Co – 11 thousand tons (content from 0,05 to 0,07 %) are concluded. In samples of dusts and slags significant correlation of maintenance of Cu, Ni, Co and noble metals is observed that allows to assume reasonably possibility of receiving MPG, gold and silver by methods of enrichment of a concentrate of non-ferrous metals.

The Ural technogenic fields. Two-centuries operation of platinum fields of Ural formed rich reserves of platinum-technological-chromite deposits, most of which are related to the two main industrial sites – Isovsky and Nizhny Tagil. In technogenic Ural scatterings prevail microparticles of minerals of MPG and gold with an average size of 2–12 microns with fluctuations from 1–2 to 20–30 microns which can not be extracted by standard gravity methods when in the development of primary scatterings. Valuable components of the Ural technogenic fields are presented with more than 30 types of minerals of PGM, pure gold and silver, chrome spinel, magnetite and ilmenite. The main platinum minerals of scatterings are isoferroplatinum and tetraferroplatinum. Technogenic deposits of Ural contain tens tons of PGM (mainly platinum, osmium and iridium), tens of thousands of tons of high-chromium platinometal chromium spinels and tons of associated gold.

Siberian technogenic fields. It is necessary to pay attention to technogenic stocks of the platinum chromites formed at working off of platinum scatterings of Aldan (the Inaglinsky and Kondersky field). The chromite concentrates allocated at enrichment of scatterings, belong to chemical type (Cr_2O_3 < 48 %, Cr:Fe < 3:1). Representing complex raw materials, chromites contain to 0,5–1 g/t of the PGM, primarily located in scattered forms that are difficult to concentrate by enrichment methods. Annual technogenic accumulation of chromites makes to 50 thousand tons? and in this connection, the problem of allocation of platinoids from them is not less actual, than extraction of the main component – chrome. Cost-effective chemical and metallurgical processing of mine, rather small technogenic fields of chromites, can be only be realized in the production of commodity chrome compounds (e.g., expensive chromic anhydride or metal chrome) and passing platinum product directly at working off of scatterings, including mobile modular installations, immediaely after separation of a placer platinum concentrate in a concentrating cycle [6].

Summarizing, it is possible to note that researches of the last years show that objects of secondary platinum raw materials are various by the nature, the content of metals, scales of accumulation and the economic importance. Secondary resources, despite large volumes, are characterized by the unstable maintenance of MPG and non-ferrous metals. Forms of finding of platinum metals in technogenic raw materials are that that the raw materials are persistent for processing with use of traditional technological schemes. Thus cost of extraction of MPG from technogenic fields sometimes happens lower, than at enrichment of initial ores and sand as the expensive operations connected with production are excluded from a technological chain, by crushing, crushing and classification.

The essential circumstance constraining involvement of technogenic materials in processing, is that they are considered by the large mining enterprises first of all as the geotechnical systems providing long-term storage of mining waste, and to a lesser extent as secondary mineral resources. From these positions perspective concession development of technogenic platinum fields with use of modern hydrometallurgical technologies is represented.

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The work was submitted to the International Scientific Conference «Actual problems of science and education», Cuba, March, 20-31, 2013, came to the editorial office 05.02.2013.

THE COMPOSITE BUILDING MATERIALS ON THE BASIS OF THE FOREST COMPLEX WASTE WOOD

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In the past two decades, the waste wood integrated management is given the quite serious attention and the consideration. So, the wood particle boards and the wood – fiber – glass panels production has been reduced, to some extent, the junk waste and the worthless waste products amount, but millions of tones of them are being left in the forests, in the woods, in the heaps of the woodworking plants, they are simply being burnt, and etc.

So, the waste wood use is quite presented the extremely topical and actual one, in the direction of the rather and the very valuable product receiving – the furfural, and also its derivatives. So, the furfural polycondensation with the acetone is quite allowed by us to be obtained the FAM resin, which is the bonding agent at the resistant – chemically constructional and the lining composite building materials (CBM) production.

Thus, the CBM creation has been the main goal of our developments, with the high corrosion resistance, under the highly aggressive and the corrosive environment conditions of the electrolytic productions, and, in addition, they are able to be withstood the long operational loads. So, this type of the material has been called the fiber – glass polymer concrete (FGPC) [1], or, at the new terminology, – the fiber – glass composite material (FGCM).

So, the sufficient wetting by the resin (e.g. adhesive) of the fiber – glass reinforcement (e.g. the substrate), having contained the lubricant, and, having introduced into the polymer – concrete mixture during the molding process, is the necessary condition for the FGCM monolithic structure formation. For all this, there is: the micro– and the macro–fiber–glasses introduction into the resin; the adhesive large molecules diffusion to the substrate surface through practically almost remote lubricant's rather very thin layer, having deluted, as a result of the polymerization exothermic reaction high temperatures, and, then – the hydrogen bonds adequate strength establishment, having closed the adsorption process. So, the system hardening, which is followed by the oligomers' molecules cross – linking, is the last stage of the strong adhesive bonds creation, in the section zone of the fiber – glass – polymer matrix.

Thus, we have already used, at the same time, three theories – the surface wetting theory and the mechanical and the molecular adhesion theories, for the bonds formation mechanism to be explained in the section zone. The lubricant is played the plasticizer layer role, which is helped to be increased the FGCM strength, as a result of the shear stress local removal, having generated in the section zone of the fiber – glass – polymer matrix, due to the large shrinkages of the FAM resin, and also, in view of the elastic moduli and the thermal expansion coefficients difference of its components. So, the polymer matrix environment does not affected negatively upon the fiber – glass reinforcement main properties, having provided the FGCM high long – termed strength and the stiffness, having operated under the liquid aggressive and the corrosion media of the chemical productions, the increased temperatures (e.g. up to 100ºC), and the electric current conditions. So, the proposed theoretical conditions viability of the FGCM monolithic structure formation has been confirmed experimentally [1; 2]. The FGCM on FAM has been shown the high efficiency at its use, as the structural material of the processing bath enclosures, the tanks, the settling tanks [3], the chemical – resistant precast monolithic floors, having subjected to the complex exposure of the constant load, the liquid and the gaseous aggressive and the corrosive media, the temperature, and the electric current.

So, this material can be used for the housing units of the wood – chemical productions, for ex-