

INTERNATIONAL SYMPOSIUM

"ENVIRONMENTAL AND ENGINEERING ASPECTS FOR SUSTAINABLE LIVING"

Programm Abstracts

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CONTROL OF SOIL PURIFICATION FROM POLYCYCLIC AROMATIC HYDROCARBONS

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Great damage to soil is caused by pollution by foreign chemical substances. Over the last years, this pollution has been happening on a global scale. As a powerful natural sorbent, soil has the ability to accumulate various pollutants, by-products of many industries. Therefore, the development of methods for the reduction of toxic load in soils is a critical task.

It is well-known that the Laser-Induced Fluorescence (LIF) method of soil remediation makes it possible to create a quantitative evaluation of the remediation process and assess the state of the pollutant in the soil. At the same time, it is also possible to use LIF for the measurement (both field and laboratory) of the number of polycyclic aromatic hydrocarbons.

We have thoroughly analysed the existing control methods of soil purification from chemical pollutants, which enabled us to develop optimal methods for carrying out an LIF analysis when having limited material resources allocated for the measurement experiment, thus increasing the total performance efficiency of the LIF analysis system.

The analysis of numerous sources allowed us to detect a great number of factors which influence the general form of LIF spectra and appear under different condition of the conducted experimental studies.

We have realized an information optimisation of the LIF control system of soil contamination by polycyclic aromatic compounds.

The minimally achievable quantity of the measurement data in the system has also been evaluated.

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INVESTIGATION OF COMPLEX PROCESSING OF THE HARDENRICHABLE PYRITES-POLYMETALLIC ORE BY USE OF AUTOCLAVE OXIDIZING LEACHING METHOD

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In consequence of the decrease of easily enrichable polymetallic ores reserves there are drawn into processing the poor and hard enrichable ores. For this reason there are observed the increase of pyrites contents both in the ore and the products of its enrichment.

The sphere of legal regulation of water supply and wastewater disposal is being reformed. Our company is one of the sector leaders and therefore we can take an active part in the development of new regulatory framework. Regulation in this sphere is based on the sectoral federal act – the Law of Water Supply and Wastewater Disposal, and over 20 regulatory legal acts adopted in pursuance of the Law. Moreover, self-regulation of water supply and wastewater disposal may be applied to some customer categories at local levels. In St. Petersburg, such regulatory system was developed with close participation of our company and has been functioning successfully over two dozen years.

V.V. Gavrilenko

MAIN PROBLEMS OF ECOLOGICAL GEOCHEMISTRY IN ST. PETERSBURG AND OTHER LARGE CITIES

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At present, ecological geochemistry is one of the most central research fields in the area of geosciences because it is not only connected with the human life, but also with the life on Earth in general. Biosphere is not just an "environment" for living beings, it is rather a system of geochemical and geophysical bio-inert interactions, in which intensive chemical and energy processes take place on the border between different types of matter – living and inert (nonliving) – while changing each of them. For this reason, the term "environmental geochemistry", typical for scientific literature in the West, is not always correct enough; we apply the term "ecological geochemistry".

Ecological geochemistry is a direction in geochemistry which researches interconnections between living and inert matter on the level of chemical elements as forms of organisation of matter.

Millions of people live in large cities in which, as a rule, geochemical situations are very much different from normal natural conditions. Water and air monitoring is an important condition for the health of population. However, territories which have been gradually accumulating toxic components for a long time can only be detected during the examination of soil and bottom sediments as indicators of such an accumulation.

Many types of geochemical anomalies are found under various geoecological conditions. However, it is possible to arrange them into groups according to the main geochemical factors in order to point out the most dangerous ones for each specific city.

Natural regional factors, associated with the city's confinement to the main geological structures and geochemical fields in the region as well as specific climatic and landscape zones. In particular, the natural regional factor for St. Petersburg is its location on the border between the territories of the East European Craton and the Fennoscandian Shield. This is reflected in the structure of the Gulf of Finland, in the difference in the nature of erosion between its northern and southern shores, in the composition of its bottom sediments as

well as in different hydrogeological and landscape conditions of the northern and southern parts of the city.

Anthropogenic regional factors are primarily caused by a long-range air and water transport and its effect on the regional towns along its path of motion. It is most clearly manifested in the content of radionuclides in the soil and bottom sediments in cities which were "covered" by the fallout after the Chernobyl disaster.

Natural local factors determine the local water and air situation under specific geological and geochemical conditions. For example, the presence of the Ordovician horizon of black shales within the city limits of St. Petersburg determines the radon danger zone in the southern part of the city. The position of buried valleys determines geotechnical risks which might happen, for example, during underground construction works. The dominating air circulating system has its effect on the distribution of the precipitation of pollutants in different parts of the city.

Anthropogenic local factors is the most complicated and difficult to analyse group of factors when studying geochemistry of large cities. They represent a set of constantly changing sources of harmful substances in the air, soil and water discharge depending on the changing direction of industrial activity in different parts of town.

The identification of specific factors in the formation of geochemical fields and anomalies is a major problem in the ecological geochemistry of large cities. From the point of view of geochemistry in the area of life activity, a particular risk is created by domestic and industrial waste landfills. There is no safe disposal of these landfills in Russia, which puts the population in cities at additional ecological and geochemical risks.

Laidmila Gilyanaya

CONTEMPORARY IMPLEMENTS OF ENVIRONMENTAL EDUCATION ILLUSTRATED THROUGH THE INTELLECTUAL ROLE-PLAYING GAME "GREEN ECONOMY"

State Institution of Culture "Moscow Youth Multifunctional Center", Moscow, Russia

Modern people living fast paced lives don't often pay attention to the fact that our natural environment is still deteriorating. At a personal level it is a difficult problem that's often easiest to ignore or brush aside – we have so many pressing day to day problems that seem more important.

At a governmental level, each country has the urgent problems of economic growth, political stability, along with social and cultural priorities. However, the world environmental situation affects not only each individual state, but also every person living on this planet. What could be done to stop waiting and start acting?

The Moscow Youth Multifunctional Center is one initiative to help answer this question.