

AP19678770 “Radioecological aspects of radioactivity of steam coal and ash and slag waste in the context of their impact on the environment” – p.m. Pak Yu.N.

Relevance:

The relevance of the results is associated with the study of radioecological aspects of natural radioactivity of steam coals and ash and slag wastes in the context of their negative impact on the environment.

Radiation hazard associated with natural radioactive elements contained in coal is one of the important problems of coal power engineering, which is underestimated in Kazakhstan. System monitoring of radioecological safety is necessary to reduce exposure of personnel and population living in the areas of location of coal-fired TPPs. The existing norms of radiation safety are limited by the content of radionuclides only in ash and slag wastes when they are used for construction purposes.

The project purpose:

The project purpose is to assess the impact of the use of coals containing natural radioactive elements in fuel power engineering on the radioecological situation of the environment.

Expected and achieved results:

- The distribution of naturally occurring radioactive nuclides during coal metamorphism is studied;

- The article was published in the domestic edition recommended by SHEQAC:

Pak D., Tebayeva A., Pak Yu. "Instrumental express analysis of ferromanganese ores by nuclear-geophysical method" // Proceedings of the University / Abylkas Saginov Karaganda Technical University. - Karaganda, - Issue. 4, 2023, - P. 104-108. DOI 10.52209/1609-1825_2023_4_104;

- A Eurasian patent included in the Derwent Innovations Index database (Web of Science, Clarivate Analytics) was obtained:

Eurasian patent #046319, 2024. Pak Y., Pak D.Y., Tutanov S.K., Ponomareva M.V., Ponomareva E.V., Tebaeva A.Y., Matonin VL. “Radiometric method of estimation of the content of natural radioactive elements in coal”.

<https://www.eapatis.com/Data/EATXT/eapo2024/PDF/202391998.pdf>.

Expected publications:

Obtaining 1 (one) patent included in the Derwent Innovations Index database (Web of Science, Clarivate Analytics) - **August 2024**

Publication of 2 (two) articles and (or) reviews in peer-reviewed scientific editions indexed in Science Citation Index Expanded of Web of Science database and (or) having CiteScore percentile in Scopus database not less than 50 (fifty) - **May 2025**

2 abstracts will be presented at international conferences – **September 2025.**



Figure 1 - Determination of specific activities of natural radioactive nuclides of coal samples



**Figure 2 - Spectrometric installation
MKS-01A "MULTIRAD"**



**Figure 3 - Measurement of specific
activity of gamma-emitting
radionuclides**

Research team and project management:

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List of publications:

1	Pak D., Tebayeva A., Pak Yu.	“Instrumental express analysis of ferromanganese ores by nuclear-geophysical method” // Proceedings of the University / Abylkas Saginov Karaganda Technical University. - Karaganda, - Issue 4, 2023, - P. 104-108.
2	Pak Yu., Pak D.Yu., Tutanov S.K., Ponomareva M.V., Ponomareva E.V., Tebayeva A.Yu., Matonin VL.V.	Eurasian Patent No. 046319, 2024. “Radiometric method for estimating the content of natural radioactive elements in coal”.
3	Pak D.Yu., Tebayeva A.Yu, Pak Yu.N.	Nuclear-physical method of coal ash content control. International Scientific Conference “Geology in Space and Time”, Lomonosov Moscow State University Branch, Dushanbe, 2024, pp.100-1012.
4	Pak Yu.N., Ibatov M. K., Pak Yu.N., Tebayeva A. Yu.	Fundamentals of Scientific Research and Inventive Creativity. Textbook with the griffin of the Ministry of Science and Education of the Republic of Kazakhstan. Karaganda, KTU Publishing House, 2024, 151 p.
5	Pak D.Yu., Tebayeva A.Yu, Pak Yu.N.	Laboratory practice on nuclear technologies in geological and geophysical research (III part). Publishing house of NPJSC Abylkas Saginov Karaganda Technical University, 74 pp. Textbook

Information for potential users: Studies on natural radioactivity of coals and ash and slag wastes arising from their combustion in the coal power industry are necessary for fuel power enterprises and state environmental control services

Scope: Earth and environmental sciences.

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