

RESEARCH OF ACTIVITY OF BENTONITES FROM DIFFERENT DEPOSITS

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Environmental condition, pollution of atmosphere, water, soil, quality of products used by population are basic ecological factors determining health of population. One of these factors impacting negatively on environment is radioactivity. Radiation background of ecosphere forms precondition for diseases, weakens immune system, increases risk of vascular heart disease, sensory organs and vision. Radionuclides spread in the body with blood and lymph and settles in the lungs and accumulating in lymph nodes become the source of radiation.

A number of radionuclides of uranium, thorium and radon series are extracted with oil during extraction of oil and gas on earth. Radon is 7.5 times harder than air and accumulates in lower layers of atmosphere. Analysis of radiometric background shows that uranium, thorium and radioactive potassium contribute its increase. In oil-gas development zone radiation level usually reaches 69-450 mR/h at norm 5.7-6.0 mR/h. Resulting accumulation process on oil extracting areas, radiation background is observed and this is induced by flow of stratal water with radionuclides and heavy metals.

Uranium is also a part of multiple minerals and its mineralization is partially related with clayish and oil-shale, conglomerates of bentonite. Bentonite dry mud is widely used in oil extracting industry which covers walls of oil well with thick layer preventing oil and gas penetration. One of the most in-demand is bentonite molding clay (glass-pot clay withstands temperature up to 1580°C). Its form-holding power in raw and dry condition, gaspermeability, high bonding properties and tackiness became widely used in metallurgy, introduction of 5% mineral is enough to make the forms extra strong. In construction bentonite clay raw materials are used as a hydro and heat-isolation. Solutions which are used in tunneling by HDD method are prepared on the basis of bentonites. By this way bentonites have found wide application in many fields of industry.

Considering the abovementioned the study of radioactivity level of bentonites is of scientific and practical interest. Aim of the research was determination of radioactivity of bentonite rocks of different samples taken from Gizil Daran and Dash Salahli depending on occurrence depth. It should be noted that quantity of montmorillonite consisting of mainly bentonites strongly changes depending on occurrence depth. Bentonite samples of Dash-Salahli deposit with different quantity of montmorillonite were researched and therefore the study of impact of montmorillonite concentration on intensification of radioactivity of bentonite rocks was of main interest.

Activity of radionuclides in bentonite rock samples were determined using gamma-spectrometer (Canberra) with gel detector HPGe, activity of uranium isotopes were detected by α -spectrometer (Canberra) «Alfa Analist». The presence of uranium and radium isotopes was determined on liquid chromatography (Perkin Elmler) TriCarb 3100 TR.

Results of reseraches were presented in the table.

Radionuclides	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
	Activity of radionuclides, Bk/kg				
Pb-210	17.1 ± 6.5	37.6 ± 6.6	74.6 ± 9.1	41.8 ± 10.9	64.6 ± 9.5
Cs-137	MDA=1.25	MDA=1.32	MDA = 2.2	MDA = 2.8	MDA = 3.9
Th-232	42.1 ± 6.5	60 ± 11	77 ± 12	58 ± 7	69 ± 12
U-235	1.2 ± 0.3	1.6 ± 0.3	2.1 ± 0.5	1.9 ± 0.4	1.6 ± 0.5
U-238	29.4 ± 4.5	42 ± 6	50.3 ± 10.6	41.4 ± 9.6	34.5 ± 6.5
Ra-226	20.3 ± 1.5	33.6 ± 2.1	57.9 ± 1.4	33.7 ± 1.8	44.5 ± 2.2
Ra-228	37.0 ± 1.8	41.5 ± 2.8	50.4 ± 1.9	47.5 ± 2.8	54.9 ± 3.8
K-40	155 ± 14	325 ± 21	139 ± 15	198 ± 19	186 ± 21
<i>A_{eff}</i>	88.6 ± 11.2	139.8 ± 18.3	170.6 ± 18.4	126.5 ± 12.6	150.7 ± 19.7

Analysis of obtained results enabled to conclude that radioactivity degree of bentonite clays depends not on occurrence depth, that is quantity of montmorillonite, but on location of reservoir management.

Reference

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