metamorphism intensity. The concentration of radioactive elements in igneous rocks increases from ultramafic to acid rocks. It can be determined using radiometric methods.

REFERENCES

1. E.M. Filippov. (1973). Nuclear Geophysics. Radiometry and Geophysics radioisotope with alpha, beta - and gamma radiation. M .: "Science" Publishing House. p.512
2. Roman Kogan, Igor Nazarov, Shep Friedman. (1969).Basics of natural gamma spectrometry M .: "Atomizdat" Publisher, p.234

RESEARCH OF THE CONDENSED BEAM STOP DYNAMICS UNDER LOADING WITH A HIGH-POWER ION BEAM OF POWER DENSITY ≥ 10^{10} W/CM2

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Active research in physics of shock waves resulted in the development of a wide range of ways of excitement and registration of shock load pulses in condensed media. High-energy concentration, which is achieved by the corpuscular and laser beams exposure of sub-microsecond duration at the condensed beam stop, determines their increasingly wide use both for scientific investigations and when solving different practical tasks.

The processes of intense evaporation, vapour ionization and gas-flame plume formation take on a vital part on exposures at a condensed medium with power density of the thermonuclear range [1]. There is a number of works dedicated to investigation of shock wave and plasma processes under high-power loading [2–4].

The generalized physical-mathematical model, describing the behavior of the metallic beam stop under the external high-power energy exposure, was formulated in course of the research conducted. The characteristics of the aluminum target under the ion beam exposure of power density ≈10^{10}W/cm^2 were examined.

REFERENCES:

1. V.I. Bojko, V.A. Skvorcov, V.E. Fortov, I.V. Shamanin. (2003). Interaction of charged particle pulsed beams with matter. M.: Fizmatlit. p.288.
2. V. I. Boyko, Y. V. Daneykin, V. I. Lisov, E. Y. Pimenov. (2015). Generation of Mechanical Waves in Metals under the High Power Ion Beam Irradiation. Advanced Materials Research. -Vol. 1084. pp. 225-233
3. H. Bluhm, K. Boehnel, L. Buth, et. al. (1985). Experiments on KFK's Light Ion-Accelerator KALIF. 5th IEEE Pulsed Power Conference. Arlington. Virginia. pp. 114–118.
4. J.J. MacFarlane, P. Wang. (1996). Simulation of KALIF Applied-B Diode Shock-Wave Physics Experiments. Fusion Technology Institute University of Wisconsin-Madison. UWFDM-1005.

CHERENKOV RADIATION AND ITS APPLICATION FOR DIAGNOSTICS OF CHARGED PARTICLE BEAMS

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In this work the application feasibility for diagnostics of electron beam transverse profile using Cherenkov radiation is demonstrated. Electron beam was generated in optical fibers of 0.6 mm thick. The comparison of curves obtained from optical fibers and Gafchromic EBT – 3 X-ray films [1] has been made. The experimental results have been also compared with the model in PCLab program [2]. Using this method of measuring electron beam transverse

profile, a compact diagnostic device can be developed. The research was carried out using MI-6 microtron at Tomsk Polytechnic University.

REFERENCES

1. Sukhikh E., Sukhikh L. and Malikov E. (2015). Advanced Material Research, 1084. p. 572
2. Bespalov V.I. Program package EPHCA for statistic modeling of photons and charged particles radiation field. URL: http://portal.tpu.ru/SHARED/b/BVI/pclab

INVESTIGATION OF SEASONAL DYNAMICS OF *β*- AND *γ*-RADIATION FIELDS VERTICAL PROFILE IN THE SURFACE ATMOSPHERIC LAYER

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Since 2010 TPU together with IMCES have studied the dynamics of *β*- and *γ*-radiation fields vertical profile in the surface atmospheric layer.

On the experimental platform TPU - IMCES for monitoring flux density of *β*- radiation and the ambient dose equivalent rate of *γ* -radiation in the surface atmospheric layer scintillation detectors BDPB-01 and BDKG-03 (ATOMTEX, Republic of Belarus) installed respectively at 1, 5, 25, 30, 35 m and 1.5, 25 m are used. The monitoring of meteorological, actinometrical and atmospheric-electrical values is performed via automated information measuring system.

The results of monitoring data for the 2012-2014 years are shown in Figure 1. The variations of *β*- and *γ*-background have weakly expressed maximum in summer every annual cycle. It was found out that the gradient of the vertical profile fields of *β*- and *γ*-radiation can have different sign depending on the season. In spring, summer and autumn seasons in the absence of snow cover, there is a decrease of *β*-radiation flux density and *γ*-radiation dose rate occurring with increasing distance from the earth's surface. The appearance of snow cover leads to a significant change in the vertical profile fields of *β*- and *γ*-radiation.

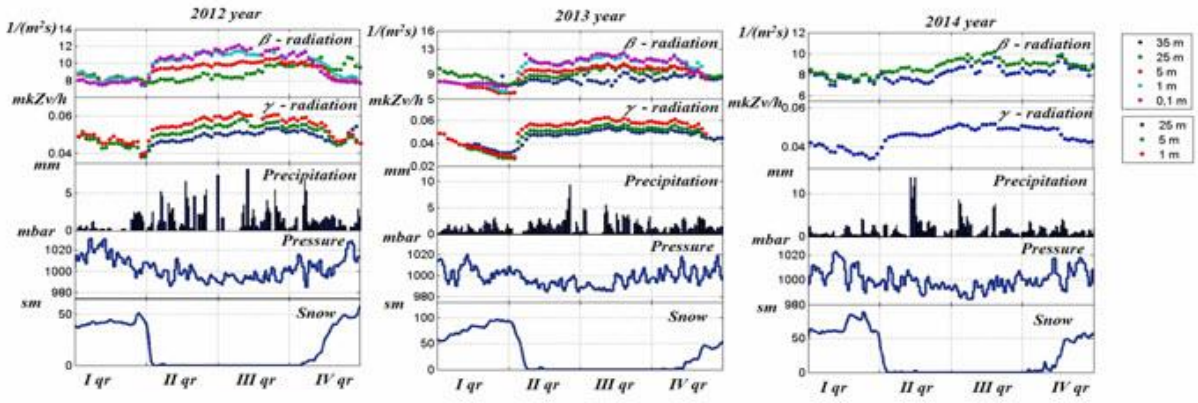

Fig. 1. Dynamics of radiation and meteorological values