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X-RAY COMPUTED TOMOGRAPHY ANALYSIS OF GEOMATERIALS

ABSTRACT. X-ray CT analysis is an express non-destructive nuclear physical method for fast estimation of internal texture and structure characteristics of mineral and technogenic raw materials investigation, allows to

obtain direct visual picture, and reconstruct the 3-D image of the sample internal structure. Since 1990 we study

geomaterials with X-ray CT technique for morphostructural peculiarities and phase composition as the basic characteristics when forecasting quality and technological data –minerals and rocks, ferrous, ferromanganese and polymetallic ores, ocean ore formations, coal, diamonds, oil and gas collectors, metallurgical slags, organogenic matter, unique objects et. [Khozyainov M. et al. Geoinformatics. 1992. №1. PP. 42-50], We used

“Geotom”BT-50- 1 unit, that combines the high resolution X-ray radiography and CT system and was specially constructed for geological tasks by PROMINTRO Ltd., Russia. Technical parameters: tube accelerating voltage 100

kB; thickness of the measured slice 3 μm ; max cross-section 15 mm; space resolution $\sim 5 \mu\text{m}$. The results of X-ray

CT implementation in the modern complex of analysis techniques for testing various geomaterials are presented.

The obtained experience enabled us to elaborate some new approaches in X-ray CT images analysis, original method of phase identification with using standard sample. The latter operates the experimental entrance parameters for analysis characteristics used in technological and mineralogical studies, quantities calculations and histograms. Today developing new innovative processing technologies challenge complete and comprehensive information of the mineral composition and phases' morphometric features that certainly determine technological characteristics because of the raw matter complicated composition, its poor quality, possible presence toxic and harmful impurities as an environmental problem. The method has proved to be a reliable tool to obtain direct, fast information for the quality and technological properties of raw materials express forecasting.

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