

Thorium Resources of Georgia - Is It Its Future Energy ?

Authors : Avtandil Okrostsvardze, Salome Gogoladze

Abstract : In the light of exhaustion of hydrocarbon reserves of new energy resources, its search is of vital importance problem for the modern civilization. At the time of energy resource crisis, the radioactive element thorium (^{232}Th) is considered as the main energy resource for the future of our civilization. Modern industry uses thorium in high-temperature and high-tech tools, but the most important property of thorium is that like uranium it can be used as fuel in nuclear reactors. However, thorium has a number of advantages compared to this element: Its concentration in the earth crust is 4-5 times higher than uranium; extraction and enrichment of thorium is much cheaper than of uranium; it is less radioactive; its waste products complete destruction is possible; thorium yields much more energy than uranium. Nowadays, developed countries, among them India and China, have started intensive work for creation of thorium nuclear reactors and intensive search for thorium reserves. It is not excluded that in the next 10 years these reactors will completely replace uranium reactors. Thorium ore mineralization is genetically related to alkaline-acidic magmatism. Thorium accumulations occur as in endogen marked as in exogenous conditions. Unfortunately, little is known about the reserves of this element in Georgia, as planned prospecting-exploration works of thorium have never been carried out here. Although, 3 ore occurrences of this element are detected: 1) In the Greater Caucasus Kakheti segment, in the hydrothermally altered rocks of the Lower Jurassic clay-shales, where thorium concentrations varied between 51 - 3882g/t; 2) In the eastern periphery of the Dzirula massif, in the hydrothermally alteration rocks of the cambrian quartz-diorite gneisses, where thorium concentrations varied between 117-266 g/t; 3) In active contact zone of the Eocene volcanites and syenitic intrusive in Vakijvari ore field of the Guria region, where thorium concentrations varied between 185 - 428 g/t. In addition, geological settings of the areas, where thorium occurrences were fixed, give a theoretical basis on possible accumulation of practical importance thorium ores. Besides, the Black Sea Guria region magnetite sand which is transported from Vakijvari ore field, should contain significant reserves of thorium. As the research shows, monazite (thorium containing mineral) is involved in magnetite in the form of the thinnest inclusions. The world class thorium deposit concentrations of this element vary within the limits of 50-200 g/t. Accordingly, on the basis of these data, thorium resources found in Georgia should be considered as perspective ore deposits. Generally, we consider that complex investigation of thorium should be included into the sphere of strategic interests of the state, because future energy of Georgia, will probably be thorium.

Keywords : future energy, Georgia, ore field, thorium

Conference Title : ICEG 2015 : International Conference on Engineering Geology

Conference Location : Paris, France

Conference Dates : July 20-21, 2015