

## Abstract

The Luvian area is known for the occurrence of springs of radioactive radon mineral waters in areas formed by orthogneisses. Samples of mineralized orthogneisses (Sněžník, Krkonoše and Jizera) found by field radiometry were examined. By the laboratory gamma spectrometry of 28 samples, it was discovered that K and Th have background concentrations, in contrast U-Ra is increased up to 108,5 ppm. The distribution of radionuclides was determined by the alpha autoradiography method in eight selected samples with the highest uranium concentrations.

According to optical and electron microscopy with ED analysis, radionuclides are present in the following mineralization stages: Common accessory minerals (zircon, monazite, xenotime, apatite, thorite) occur in the primary magmatic association. The primary magmatic uraninite s.s., associated with zircon, was found in two samples. Its presence is probably the main reason for the high fertility of luvian orthogneisses. Uraninite s.s. also occurs in the form of inclusions in pyrite in the metamorphic (syndeformative) period. Symptoms of greisenization (fluorite, fluorine-rich zircon) can be observed in the Jizera orthogneiss. The hydrothermal stage with comb-like quartz and hematite in the cavities and veinlets is evident in the Krkonoše orthogneiss.

The processes of hypergenesis are strongly manifested: Chloritization of mica to form HFO and Ti-oxides (“leucoxene”), alteration of monazite to form phosphates of the rhabdophane group (brockite), crystallization of “U-mica” autunite in cavities and fissures, and their alteration into phosphates of the crandallite group (plumbogummite).

The final stage of hypergenesis is then expressed by the radium ( $^{226}\text{Ra}$ ) phases: Mn-oxides with barium close to hollandite – cryptomelane and porous active HFO coatings on open fissures, in which the contents of nitrogen and chlorine indicate a subrecent contact with flowing water.