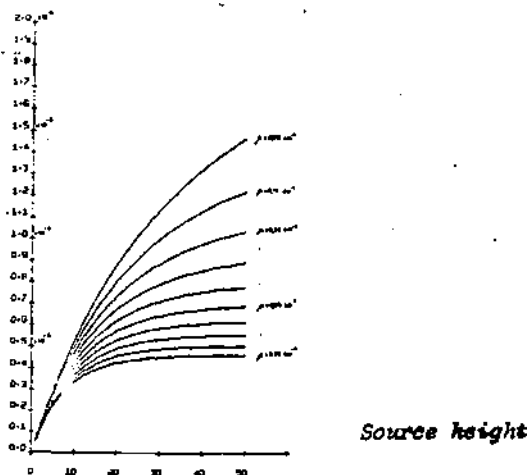


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DETERMINATION OF URANIUM IN MINERALS BY PASSIVE γ -RAY
ANALYSIS WITH Ge(Li) SYSTEM

A non-destructive gamma-spectroscopic measurements on compounds and minerals of uranium were performed with Ge(Li) system (52.8 cm³ Ge(Li) + 4096 or 512 channel analyzer). Radiation spectra were analysed and prominent lines of ²³⁵U (185.72 keV) and ²²⁶Ra (609.19 keV) were selected for the further work. For quantitative evaluations efficiency of Ge(Li) detector in the actual geometry of a large source was determined, and a program for analysis of recorded spectra was developed. The aim of this experimental work was devoted to the determination of absolute amounts of uranium in low content minerals, and, for the purpose, approximate model for self-absorption correction for radiation from a large source was developed. Results are given in useful form with absorption coefficient and source dimensions as variable parameters. The figure below shows a typical result:

Self-absorption
correction factor



Calculations were tested with artificial samples of known uranium content (185.72 keV) and with original samples of minerals from "Žirovski vrh" (609.19 keV). The typical accuracy obtained is about 10% - 15%, and detection limit in uranium concentration is estimated if the line 185.72 keV is used for the analysis. In the given experimental conditions conservative value of detection limit is about 0.5% of uranium content.