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EXPERIENCE IN THE USE OF SOLID STATE
NUCLEAR TRACK DETECTORS IN URANIUM EXPLORATION

ABSTRACT - A method for uranium prospecting based on the measurement of integrated radon concentration in the surface soil gas with solid state nuclear track detectors is described. The method depends on the fact that one daughter in the ^{238}U decay chain, ^{222}Rn , is an inert gas with a relatively long half life of 3.8 days, which allows radon to reach the earth's surface from uranium ore deposits up to 200 meters deep. Reviewed are detector exposure in the field, etching and counting of tracks and data evaluation. Several factors that effect the reproducibility and reliability of the radon measurement are discussed.

The field exposure probe was developed consisting of a tube 60 cm long and 4.5 cm in diameter containing a support for the detector foil. LR 115 type II stripping detector, suitable for automatic counting, was used to record the alpha particles emitted due to the decay of ^{222}Rn . The effect of moisture on track density was minimized by choosing a good thermal insulator for the detector foil support and by positioning the support at an appropriate distance from the soil surface. Several alternative designs of field exposure probe to separate radon from thoron are discussed.

The results from several uranium exploration programmes in Croatia, Slovenia and Austria where the method was successfully utilized are given. With the help of the method new promising areas of uranium mineralisation were found.