RADIOGRAPHY OF RADIOLOGICAL SPECIMENS USING DIELECTRIC DETECTORS

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The α-activity and presence of fission material in a geological specimen from the Alšar mine were investigated. A section of a surface area of about 10 cm^2 was cut from a sample of a mass of about 100 g, and the following minerals were established in it: lorandite, realgar, auripigment and dolomite.

Alpha activity was determined by radiography of the sample using a Kodak LR-115 nitrocellulose of a thickness of 7-12 μm. Throughout the sample an α-activity was found with pronounced peakings at two or threee points (area $\sim$1 mm^2) of the sample section (10-20 times higher). The surfaces with the higher activity could not be related to any of the present minerals and, therefore, their individual activity was subsequently examined. For this purpose the minerals were powdered and deposited as a thin layer (several μg per cm^2) on nitrocellulose. The activity was established to be approximately constant for all the minerals except for dolomite where it was very low. The energy of recorded α-particles was determined by measurement of pit diameter to be about 4 MeV. In order to investigate fission material possibly present in the sample, which undergoes spontaneous fission with $T_{SF} \geq 10^9$ years, lorandite (double Tl and As sulphide) was ground and then deposited from an aqueous suspension on a polycarbonate detector of a size of 10x10x0.02 cm^3 (about 2.5 $\mu g/cm^2$). For an analysis of possible spontaneous fission events, which are detectable in polycarbonate detector with a 100% efficiency, use was made of sandwich method (two polycarbonate foils with a target sandwiched between them). Exposure was carried out over one year. After etching and optical scanning of the detector the concentration of fission material in lorandite was estimated to be $C = 10^{-10}$ g/g sample. Comparing this result with those on alpha activity it is concluded that the activity does not originate from U^{238} and Th^{232}.