

ESR SIGNALS AND CL IN QUARTZ: INDICATORS OF MIGRATION OF URANIUM AND ITS DAUGHTER ELEMENTS IN URANIUM ORES

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Electron spin resonance (ESR) has been used to obtain ages in Quaternary erasince this method was found in 1975 to be useful for dating of stalactite.ESR dating method has also been applied to corals, shells, tooth enamels,bones, and quartz. Recently, it was shown that lattice defects in quartz mayaccumulate a signal useful for dating up to 1Ga. The authors has alreadyshown that the intensity of an ESR signal related with oxygen vacanciescorrelates with ages of its host granite and that this signal is stableenough for this age range.In this paper, it is shown that this ESR signal is also useful forestimating long term uranium migration in uranium ores. The ESR signalintensities in quartz samples of various uranium concentration correlatewith the uranium concentrations of the host rocks, with showing an isochron.The signal intensity is also consistent with existence of cathodluminescence (CL) rims which are thought to be created by alpha particlesfrom surrounding uranium. The process of formation of the ESR signals willbe also discussed together with the CL rims based on experiments ofirradiating massive charged particles to quartz samples.