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Model ages of fracture fillings and mineralogical and geochemical evidence for water-rock interaction in fractures in granite: the Melechov Massif, Czech Republic

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Abstract

The mineral, chemical and Pb-isotope composition were investigated in the host granite and low-temperature open-fracture fillings from the 100 m deep borehole PDM-1 located in the Melechov Massif of the Moldanubian Batholith. The fillings are dominated by limonite and clay-mineral (illite, montmorillonite, nontronite, chlorite) mixtures, accompanied by minor amounts of residual minerals from the parent rock (quartz, feldspars, zircon, monazite). Chemically contrasting fracture assemblages occur mainly at lesser depths (< 55 m), where a high content of Fe-oxides and hydroxides locally with Mn-oxides is common. High Fe is correlated with a very high content of U, P, and V, whereas Mn is accompanied by Li, Co, Ni, Zn and Ba. Enrichment in mechanically transported primary accessory minerals