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The genesis of Kurišková U-Mo ore deposit

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The U-Mo ores of the known uranium deposit Kurišková located in the Huta volcano-sedimentary complex (HVC) of lower Permian age belongs to the Petrova hora Formation of the North-Gemeric tectonic unit (Western Carpathians).
The HVC is built up by volcanic rocks of bimodal basalt-rhyolite association, intercalated with sandstones, mudstones and claystones. Based on the sedimentary facies reconstruction, it is supposed paleoenvironment of seasonally flooded shallow lakes of continental fluvial plain with transition to estuaries and shallow marine facies of continental shelf in the upper part of HVC.
The ore host rock complex was metamorphosed in conditions ˜350℃ (epizonal regional metamorphism). Consequently during tectonic uplift, HVC was mineralised by permeating U-Mo bearing ≤ 200℃ hot water. Geochronology of uraninite crystals provided ages of the main ore forming processes within interval of 200-160 Ma. Consequent uranium remobilization and ore maturation is dated to 150-50 Ma and 40-10 Ma. However, these modification processes were active only within limited scale.
The main ore forming minerals are uraninite, coffinite and molybdenite. They occur in various metasedimentary and metavolcanic rock types of HVC, especially on the contact with the basaltic body. Mineralization is disseminated along sedimentary structures and tectonically driven fractures in both main rock types. In many cases, contemporaneous deformation of uranium mineralization together with the straight deposition of a new uranium ores is present. Some of the molybdenite-rich subvertical faults are likely to be remnants of the aqueducts transporting mineralised waters into the deposit space.
U-Mo deposit shows Th/U « 1 and strong correlation between U-P-Pb (r >0.9) and only weak correlation with Mo (r ≤ 0.6). This suggests common geochemical history of U-P-Pb and separation of U-Mo during deposit forming processes.

Origin of U-Mo Kuriskova ore deposit: The deposit is distributed into three ore bodies of semi-tabular shape. The main ore body is spatially closely linked to mylonitised metabasalt on the contact with sediments. It is showing a role of mechanical and geochemical barrier as a key factor for U-Mo precipitation in tectonic and lithological structures.
The presented genetic model operates with a series of step-by-step leaching and precipitation processes which resulted to present-day appearance of deposit. About 200 Ma ago, percolating ground waters had invaded the uppermost parts of buried HVC and started to leach U-Mo out of rhyolitic rocks of the upper Grúň rhyolite complex. Water-rock interaction integrated U-P-Pb-Mo-S geochemical streams changed water composition (pH < 4-5; Eh > 0) enabling transport of U and Mo complexes. As water stream proceeded through subvertical fault aqueduct, continual reduction responded to molybdenite precipitation and separation of Mo-S/U-P-Pb streams. The main stage of ore precipitation is related to alteration of infiltrated metamorphosed rocks synchronically with continual deformation of HVC. The reduction and increasing pH during alteration destabilised the dissolved U-Mo complexes and iniciated the uraninite –coffinite precipitation.

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