CARBONATE MINERALIZATION IN THE WESTERN TATRA CRYSTALLINE BASEMENT, POLAND

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In the Tatra Mts. crystalline complex the carbonate veins and nests are located in the shatter zones and fissures, cutting both metamorphic rocks and granites. The High Tatras (Eastern Tatra Mts.) and Western Tatra Mts. differ in mineralogical character of carbonate mineralization.

1. In the metamorphic complex of the Western Tatra Mts., the so-called "siderites" (in fact sideroplesite-metisite) and ankeritic dolomites predominate. The carbonates are the first minerals in the mineral sequence stated here: carbonate $\Rightarrow$ quartz + sulphides $\Rightarrow$ barite (PAULO, 1970). Cathodoluminescence investigations of carbonate veins show that a small amount of calcite is also present in brecciated carbonate veins as cement, binding the "sideritic" and dolomitic clasts.

2. In the High Tatra granitoid intrusion the rare ankeritic dolomites precipitated directly on the quartz crystals (sometimes automorphic). The abundant calcite mineralization is the youngest in the mineral sequence, forming both individual veins and cement in the brecciated rocks. Calcite locally forms pseudomorphs after ankeritic/dolomitic clasts but with preserved "ghost" structures.

The differences in the mineralogical character of carbonates in different locations could be influenced by the local changes in lithology and chemistry of host rocks. REE patterns of the ankeritic dolomites from the Western Tatra and the High Tatra Mts. show a pronounced LREE depletion with positive Eu and Tb anomalies. Such features suggest very low fO_2 in the mineral forming fluid and REE mobilisation by F^-, OH^-, CO_3^{2-} poor fluids at rather high temperatures, while precipitation from the fluid should occur in the low temperature regime (BAU & MÖLLER, 1992). Sideroplesite from the Western Tatra Mts. show steep REE patterns with LREE enrichment and no Eu and Tb anomaly, atypical for Fe-Mg carbonates (BAU & MÖLLER, 1992).

The investigations of C and O isotopes in carbonates show that $\delta^{18}O$ and $\delta^{13}C$ have relatively high values in the W. Tatra "siderites" and ankeritic dolomites (-14.82 ‰; 14.91 ‰ for $\delta^{18}O$ and -5.32 ‰; -5.42 ‰ for $\delta^{13}C$). $\delta^{18}O$ and $\delta^{13}C$ for High Tatra carbonates have somewhat lower values (-16.62 ‰; -18.32 ‰ and -6.29 ‰; -7.33 ‰, respectively). In both cases the exogenic origin of mineral forming fluids is suggested. As an extreme case, in one calcite vein from the High Tatra Mts. the values of $\delta^{18}O$ = -22.43 ‰ and $\delta^{13}C$ = -12.33 ‰ are typical of biogenic origin, which has no plausible explanation as yet.

References

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