The variability of chemical composition of the syntectonic fluids, Moravo-Silesian Paleozoic

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The Moravo-Silesian Paleozoic area is built by Devonian and Carboniferous limestones and siliciclastic rocks (shales, siltstones, greywackes and conglomerates). The entire area is influenced by the low-grade Variscan metamorphic events. Hydrothermal veins are widespread throughout sedimentary sequences. Two main types of fluid systems were distinguished during last 20 years – syntectonic (late Variscan) and post-tectonic (Mezozoic – Tertiary). Still we do not know much about P-T-X conditions of syntectonic fluid system in comparison to post-Variscan one. There are some data from a few localities but details of the fluid nature is missing.

The syntectonic veins are mainly made up of quartz, calcite and chlorite, rarely of albite and in a minimal quantity of sulphides (pyrite, chalkopyrite, galenite).

Four localities are in centre of our interest. Three of them are situated on margins of the Moravo-Silesian Paleozoic and one is situated approximately in the middle.

There are 2 types of fluid inclusions in quartz (primary and pseudosecondary) which were investigated – liquid (L) + vapor (V) and vapor only. Chemical composition of L+V inclusion were determined as H_2O-NaCl ± Mg, K, and Fe chloride, meanwhile chemical compostition of vapour-rich inclusion is CH_4-CO_2.

Homogenization temperatures of two-phase inclusions vary between 112 to 348°C. The ice-melting temperatures suggest low salinity of fluids – 0,5-8,3 wt% NaCl eq., where higher salinity comes from inclusions in quartz veins within fine-grained rocks. Methane is dominating species in CH_4-CO_2 inclusions – its content range between 80 and 98 mol. %. A little amount of liquid hydrocarbons in some CH_4-CO_2 inclusions has been detected in south part of study area.

Chlorite geothermometry were applied only on samples from western part of the area. The temparatures range between 200-285°C which correspond to the temperatures obtained from microthermometry.