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Thermometric data of the high-temperature vein quartz from Wądroże Wielkie area (Fore-Sudetic Block, Poland).

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The Wądroże Wielkie granite-gneisses with the accompanying quartz veins belong to the Kaczawa metamorphic unit and are situated in the Fore-Sudetic Block. The age of the granite-gneisses (orthogneisses) is 548±9 Ma (1), while the origin of the quartz veins is linked to the Herzynian orogenesis. The Wądroże Wielkie massif formed as a horst most probably during the Palaeogene-Neogene. The massif displays a tectonic contact with the Palaeozoic schists. Due to intensive physical and chemical weathering, the Wądroże Wielkie granite-gneisses underwent kaolinization during the Neogene. Kaolinites are accompanied by quartz veins of different thickness. The biggest quartz vein in Taczalin reaches a length of 800 m and a width of 35 m. It is elongated towards NW-SE. The vein quartz contains a gold admixture. Due to weathering, the gold-bearing veins were disintegrated resulting in gold-bearing placers exploited in the XIVth century. Later research has so far failed to find any economic primary gold deposit, although gold in association with quartz was found and studied (2). The quartz rocks are represented by quartz veins and by metasomatic rocks. The quartz is the main rock component. Numerous minerals, both ore and gangue ones, are present in small amounts (3); only sericite, pyrite and Fe-hydroxides are locally abundant.

The origin of the quartz rocks from the Wądroże Wielkie area was determined on the basis of fluid inclusions analysis. The homogenization temperatures of the fluid inclusions range from 70 to 410^{o}C. This temperature interval includes the previous thermometric data (2, 4 and others). Most frequently the fluid inclusions homogenise to the liquid phase. The high temperature stage of quartz crystallization is the most important for gold precipitation. These temperature conditions are recorded by a population of fluid inclusions with differentiated phases, predominantly three-phase fluid inclusions, which homogenise at temperatures of 302-338^{o}C; and by heterogeneous inclusions, which homogenise in the range from 270 to 331^{o}C under immiscibility conditions. The compositions of the brines were dominated by NaCl-KCl. The salinity of the parent solutions varied from 0 to 23.2% eq. NaCl, with dominance of the 0 to 9.6% range (5). These fluid inclusions contain a gas admixture of varied compositions (CO_2, CH_4, H_2S, N_2). This quartz crystallized from hydrothermal fluids, which circulated inside fault zones reaching deep magmatic environments, common to the Strzegom granite and probably to most of European Hercynides. Fluids may also have been enriched with elements coming from the greenstone formation of the Kaczawa structure.

The lithostatic pressure for the homogenous fluids was estimated to be close to 1200 bar by the cross isochore method. The minimum depth at which quartz crystallized from heterogenic fluids, was determined to be about 1000 m, on the basis of Shepherd's formula and diagram (60). Heterogeneity of fluid was caused by significant decrease of pressure (up to minimum pressure 265 bar) associated with e.g., the fissure opening or other tectonic event. The $\delta^{18}O$ values of quartz (between (-3.7)‰ and (+3,7)‰) indicate the possibility of mixing of meteorite and juvenile fluids. The mixing zone of water and heterogeneity of fluid is conducive to gold precipitation. Similar temperatures and pressure in the range 300-1200 bar were determined in a number of occurrences of quartz vein in the Sudety Mts and their foreland, e.g. in the Radzimowice area. In the Radzimowice area similar isotopic composition of $\delta^{18}O$ was found (7).

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