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GEOLOGY, MINING AND PETROLEUM ENGINEERING (ENGLISH, GERMAN)

CONDITIONS OF QUARTZ VEINS FORMATION ON THE QUARTZ HILL SITE (YAKUTIA)

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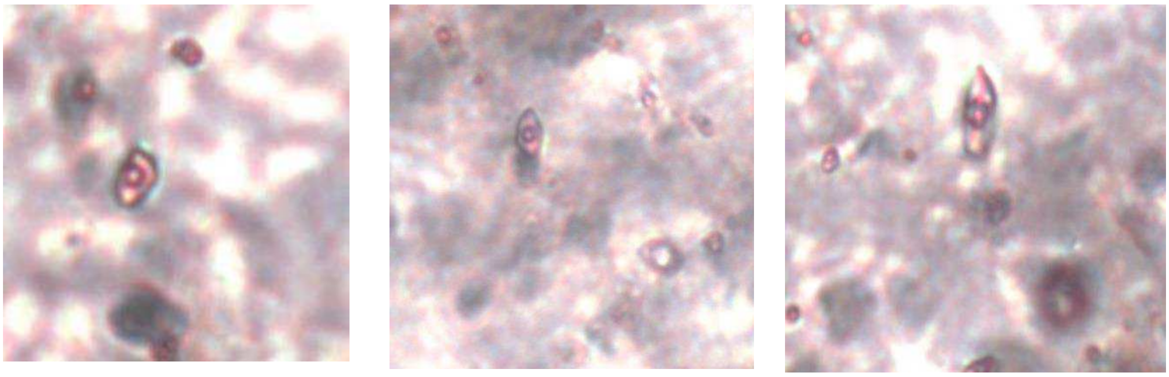
The mineralization "Quartz Hill" is located on the watershed district Tobychana and its left tributary creek Nartova. It was explored by 25 ditches and one trench. It is situated in the south-western part of the ore- placer Zhdaninskogo site and it covers an area of about 1.0 m. km. It is located in the south-west wing Taryno – Elga Synclinorium folded Jurassic sediments. In the plan the site of the mineralization is located on a joint faulting northwestern and sublatitudinal. Sandstone and siltstone with the Hettangian and the Sinemurian tiers and Lower Jurassic are ore occurrence enclosing rocks.

There is a gold-bearing ore zone of linear stockwork veinlet silicification on the ore occurrence area. It is limited to the formation of sandstone and it represents a series of contiguous thin (up to 2-50 cm) various quartz veins and veinlets. The length of the zone trenches is outlined for 500 m, its thickness varies from 1.8 to 33.6 m (average 9.53 m).

Study of the conditions of quartz veins formation was based on the method of gas-liquid inclusions. When the research work is carrying out 10 quartz plates that contain fluid inclusions have been investigated. These plates were made of rock samples containing visible gold ore. The most representative inclusions are placed in the plate 7.



a) **b)** **c)**

Fig. 1 Primary two-phase gas and liquid inclusions in a quartz plate 7

Primary inclusions were large, they had the regular shape of a rhombus, they consisted of two phases – gas and liquid (Fig. 1). Primary and secondary [1] or pseudo-secondary [2] inclusions had the smaller size, they were located along cracks and they also consisted of two phases – gas and liquid (Fig. 2). They were formed as a result of curing of the cracks appearing in the process of the attaining the level of crystals [1]. According to the size the inclusions are small, their length is 5-7 microns, seldom it is 10 microns.

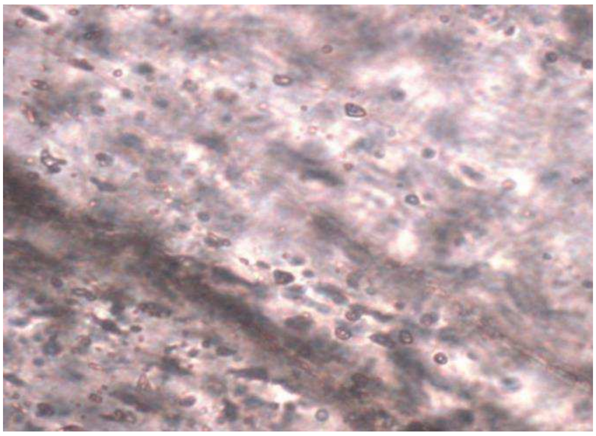
We measured such indicators, as eutectic temperature, temperature of ice melting and homogenization temperature.

Technique of the temperature data measurement:

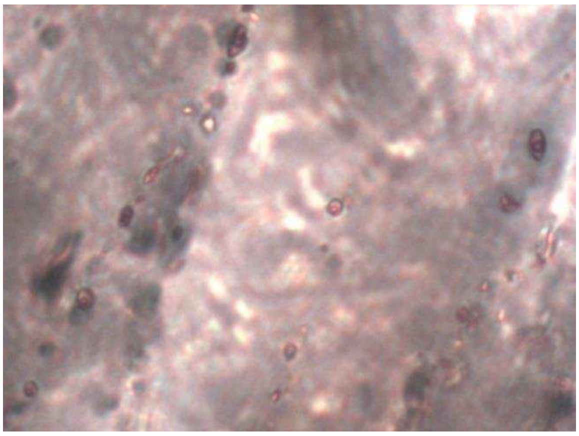
1) We find rather representative inclusion then we cool a site to – 50 C°. We observe the condition of inclusion which becomes darker with reduction of temperature. When the inclusion has completely darkened, we start heating the inclusion. We fix temperature at which there is the first drop of liquid, and it will be eutectic temperature.

2) We continue heating, and we fix temperature of melting of the last crystal of ice. It is temperature of ice melting.

3) We heat gas and liquid inclusion to the temperature of 200 – 350 C° while it does not become homogeneous i.e. until the vial of gas isn't dissolved in the surrounding liquid phase (Fig. 3). We fix the temperature of homogenization.



a)



b)

Fig. 2 Primary and secondary inclusions of the idiogenous cracks of curing in growing crystals in a quartz plate 7

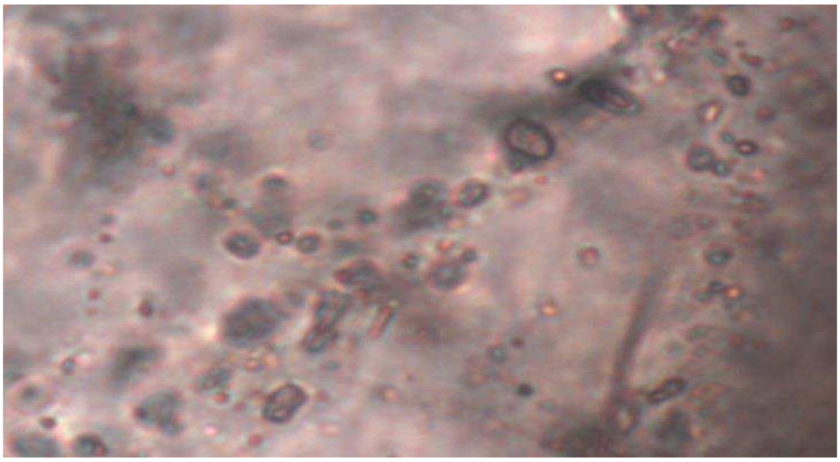


Fig. 3 Homogenized fluid inclusion from gas in the liquid phase, temperature 2670 *C*, the quartz plate 7

Thus, we studied 10 quartz plates, from these 10 plates 42 sites with representative fluid inclusions were pricked out, more than 40 gas and liquid inclusions are studied.

According to measured temperatures we have come to conclusions.

1) Temperature of eutectic allows us to tell about salt composition of hydrothermal solutions.

The temperature of eutectic is equal – 37° C for 70% of the studied inclusions. We can say that there are NaCl salts - FeCl2 - H2O in the solutions. The temperature of eutectic is equal - 23.5° C for 30% of the studied inclusions. It allows us to tell that there are NaCl - KCl- H_2O salts in the solutions.

2) According to the temperature of ice melting we can tell about the concentrations of salts. The dependence of salts concentrations (% NaCl) is shown in Fig. 4.

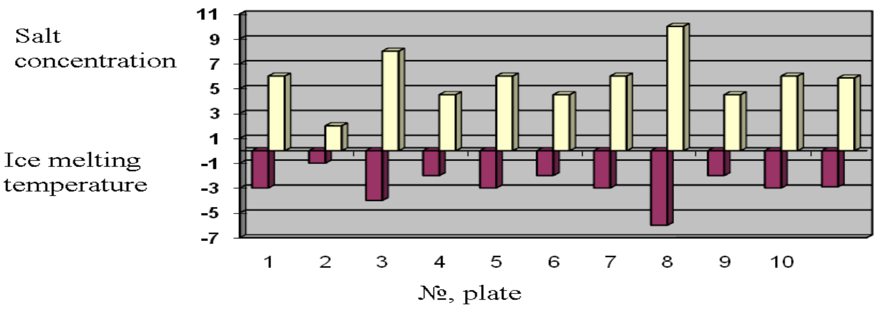


Fig. 4 Dependence of salts concentrations on the temperature of ice melting

Thus, the average temperature of ice melting of is T= 2,9° C, and the concentration is K=5,85 salts mas. NaCl-eq. %.

3) According to homogenization temperature we can tell about the minimum temperature of the mineral formation. The results of each plate (average values) are presented in Figure 5.

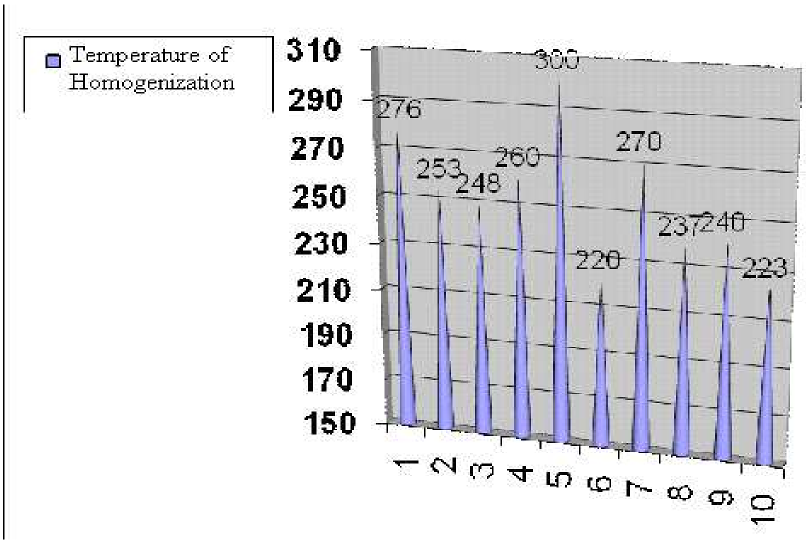


Fig. 5 Results of measurements of temperature of homogenization; average values on each plate are given

Thus, the average temperature of homogenization is 270 °C.

Investigating these data it is possible to come to conclusion: that quartz in which gold is revealed, was formed at average temperatures. Medium temperature quartz is grayish and it has got dense texture and that distinguishes it from low - and high-temperature one.

Conditions of quartz veins formation of the Hill Quartz are similar to conditions of the commercial gold deposits formation. On all fields gold from solutions with salinity from averages 5 Mas. % equiv. NaCl to the maximum values (45 Mas. equiv %.NaCl) is deposited in the temperature interval 280 … 160 °C [3, 4, 5].

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DIE MODELLIERUNG DER MISCHERARBEIT DER ANLAGE VON ALKYLIERUNGDES BENZOLS MIT ÄTHYLEN

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Unter den zahlreichen Prozessen der petrochemischen Synthese nimmt die Produktion von dem Ethylbenzol eine der führenden Rollen ein. Ethylbenzol wird Benzin zur Erhöhung der Oktanzahl (Klopffestigkeit) beigemengt. Es ist Lösungsmittel für Farben und findet sich in Kunststoffen. Es ist ein wichtiger Ausgangsstoff für die Synthese des Styrols. Neben dem Benzol und dem Toluol gehört Ethylbenzol zu den technisch wichtigen Aromaten, den so genannten BTEX-Aromaten[1].Zurzeit erreicht die Mächtigkeit der weltweiten Produktion des Ethylbenzols 45 Mio. Tonnen im Jahr [2].

Das aktuelle Hauptproblem von der Herstellung des Ethylbenzols ist die Verschmutzung der Abwässer mit den Aluminiumskationen.

Die Konzentration die Kationen erreicht in den Abwässern 5–15 g/dm3 bei der Norm 0,4 Milligramm/dm3. Die Lösung des Problems ist möglichmit der Rekonstruktion der Ausrüstung, was die Intensivierung des Vermischungsprozesses verwirklicht und zum wirksameren Verlauf der chemischen Alkylierung und den Verbrauch desKatalysators senkt[3].