

TO THE QUESTION ON TYPOMORPHISM OF QUARTZ FROM THE GOLD-SILVER DEPOSITS LOCALIZED IN EAST-ASIATIC VOLCANOGENIC BELTS

B.V.Ivanova, S.M.Soukharjevsky

Saint-Petersburg state university, Saint-Petersburg

Herald DGGGMS RAS № 5 (15) 2000 v.2

URL: http://www.scgis.ru/russian/cp1251/h_dgggms/5-2000/hydroterm16.eng

This article is devoted to features of vein quartz from the gold-silver different scale deposits, localized within East-Asiatic volcanogenic belts.

The samples of vein quartz from the ore bodies and from the quartz veins formed on different removal from intensive geochemical anomalies "ore nature" and without ore mineralization in the different metasomatic facies have been studied. This quartz belongs to single generation - vein overflow quartz. However intensity of gas emission, and, consequently, energy factor of fluids of this quartz are different. There are three groups of quartz samples varied on this parameter: with high, average and low gas emission (fig.1).

The average scale deposit Dvoinoi has been chosen for demonstration. This object is situated within Illirnei ore district (area 40x30 km), covering south part of volcanogenic Tytylveem depression and east part of Illirnei granite array. Ore knot Dvoinoi (area 18x12 km) locates on the joint of south part of volcanogenic Tytylveem depression and east part of Illirnei granite array. The cover and subvolcanic facies of andesites which are under multiform and deep hydrothermal influences, are widespread. Ore bodies belong to the gold-quartz-sulphide type of gold-silver formation and present itself quartz and adular-quartz veins.

Sampling was carried out at diametrical profiles, according to the methods [1].

For the study by EPR and TL methods samples (fraction 0,2-0,3 mm) were prepared under the methods [2, 3]. For the clarification of radiation dependency the study of amount of electronic centers has been carried out on samples got dose of natural irradiation and irradiated in addition gamma-quantums (integral dose 1 Mrad) from the source ^{60}Co (dose 50 rad/sec).

Study of amount O-Al - and E-centres in monofractions of quartz was carried out on standard strategies [3]. Determination of concentrations of centres was produced by means of the internal standard (Cr in Al_2O_3), situated inwardly of resonator.

Curves of thermoluminescence have been taken on the modified instrument "TERMOLUM" in the interval 20-450°. The measurement of accumulated lightsum was carried out comparatively by specially prepared sample. In EPR spectrums $[\text{AlO}_4]^{4-}$, Ti^{3+} / M^{2+} , Ge^{3+} , E-centres were fixed and their relative contents were calculated.

Study of spatial distribution of AL-centres in natural samples shows a sharp reduction of their amount in the ore-bearing area, as well as good coincidence with particularities of distribution of gross contents of aluminum in the quartz (fig. 2). Relative contents of aluminum centres in irradiated and natural samples ($\text{Al}_{\text{ir}}/\text{Al}_{\text{nat}}$) were calculated. Central part of ore system, containing deposit, is noted by the clear maximum. Be-

haviour of titanium is similarly behaviour of aluminum. Presence of germanium centres is connected with the presence it in fluid. Central part of ore system is characterized by the minimum contents of E-centres. Contents of E-centres and fluid content are in inverse correlations. It is possible to expect, as far as E-centre presents itself a vacancy of oxygen, in conditions of high content of fluid they occupied by the fluid components (for instance, Cl^-) and so the amount of E-centres will decrease. Necessary to notice that though such distribution of E-centres is characteristic for all objects, without of dependency of these scale, but degree of contrast for small object is vastly lower than for average and large.

Intensity of TL peaks of all natural quartzs is vastly below intensity of TL peaks of samples. For all objects for samples from potentially ore-bearing veins in natural samples is characteristic an intensive peak under 270°, but in irradiated - vastly more intensive peak under 220 degrees. Such behaviour of TL shows, firstly, the temperature influence.

Unificated location of peaks TL is observed after irradiation. It was investigated by method of consequent heating on the strategy of Soukharjevsky (1984) as a result of series from three independent experiments that TL curves present itself a position poles of peaks. Analysis of intensity of separate peaks TL and intensities of signal of separate electronic centers in EPR- spectrums has show presence of dependency between the peak under 186° and contents of E-centres, between the peak under 160° and contents of titanium centres (correlation values are 0.95 and 0.56, accordingly), but significant correlations between the intensity of TL and contents of aluminum centres is not established.

Thereby, using the methods of EPR and TL allows safely separate ore veins from barren, but for mapping of ore areas by the TL method is reasonable use not total integral intensity, but intensity of TL peak under 186°.

1. Pitulko V.M., Kritsuk I.N., Safronov D.N. Methodical recommendations on searching for ore knots and floors and evaluation their prognosis resources by geochemical methods under exploring works (on the example месторождений colour, noble and rare metals). Saint-Petersburg, VSEGEI, 1991.
2. Bershov L.V., M.D. Krilova, A.V.Speransky. Centers O-Al³⁺ and Ti³⁺ in the quartz as a factor of warm-up conditions of regional metamorphism // Izv. AN USSR, Ser. geol., 1975, N 10, p.87-103.
3. The Method of radiational defects (met. rec.). M.: Nedra, 1982, p. 43.

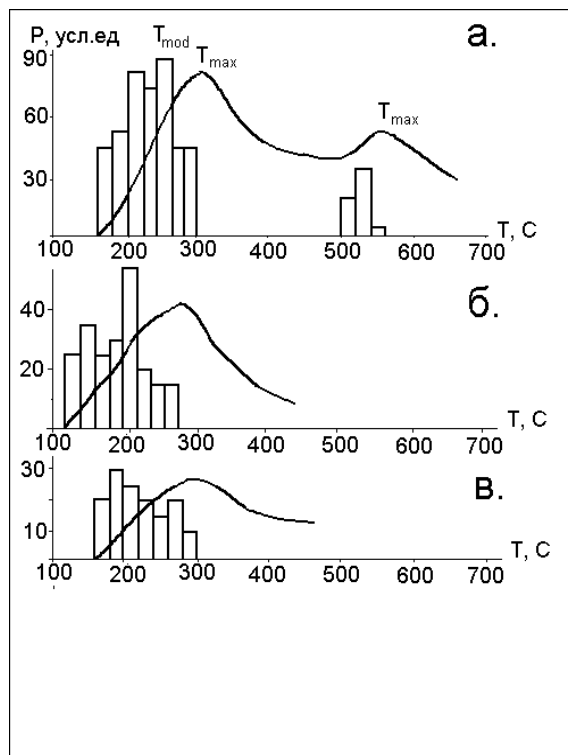


Fig.1. Typical decreptograms of quartz samples: а – with high; б – with average; в – with low gas emission

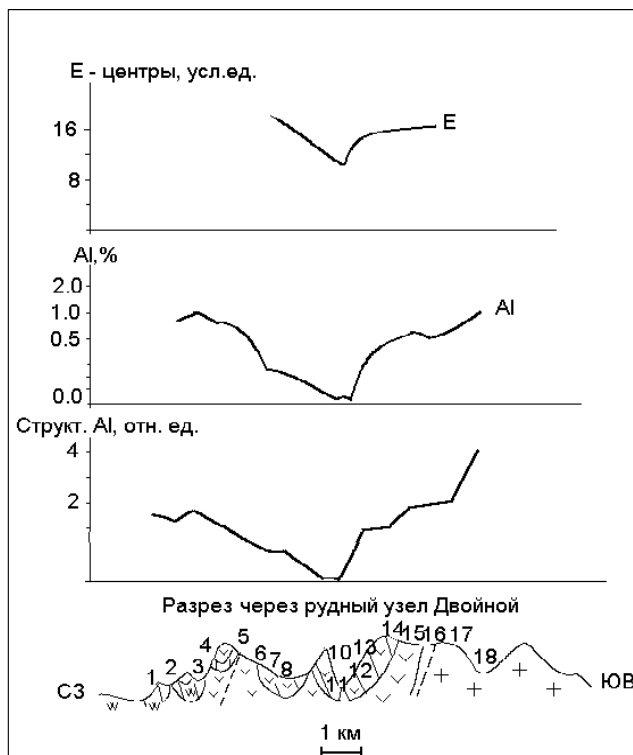


Fig.2. Distribution of E-centers, gross and structural Al in the quartz samples of ore knot Dvoinoi.