FELDSPATHOID MINERALIZATION IN EXPERIMENTAL SKARN COLUMNS

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Feldspathoid mineralization (nepheline, sodalite, cancrinite) in former experimental bimetasomatic columns was marked in two conditions: 1) when albite (or its mixture with quartz) was used as a silicate rock, and CaO+MgO as a carbonate one, with the presence of NaCl solution, and 2) on the granodiorite and limestone (or dolomite) contacts in cases of using of alcaline Na (NaOH, NaF, $NaCO_3$) solutions [1]. The only NaCl or NaCl+KCl solutions were used while our experiments have been condacted. The special feature of the experiments was the presence of sulphides (galena, sphalerite and others) or calcium sulphate. Feldspathoids have been developed at the temperatures not low than 550-600^{o}C.

Feldspathoids always develop as very large idiomorphic cristals or in their compact growths, that outstands among fine-grained and usually "friable" aggregate of another minerals of endomorphic zones of column. Sodalite or hauyne were formed in different experiments (fig.1). Sodalite more often appeared when NaCl solution was used, hauyne – in cases using NaCl+KCl solutions. Both these feldspatoids could develop simultaneously in the same experiment, though in different parts of specimen.

Feldspathoids appeared at three different structural positions: 1) at endomorphic parts of bimetasomatic skarn columns – us a rule on border between potashfeldspar-contained and plagioclase-contained zones (fig. 2 a, c). A "lateral" unsteadiness of feldspathoin zone (but as well as other ones) was clearly manifested: this zone can be completly vanished (feldspatoids developed only at the certain distance both from sulphide components source and the open edge of ampule), 2) as isolated metacristalls or vein-shaped concentrations parallel to zones borders (fig. 2 b, d), 3) at open edge of the ampule in where interaction between silicate rock and free solution took place (fig. 2 c, d).

Localization in 1-st position as a rule occured when mixtured NaCl+KCl solutions were used; in 2-nd and 3-rd ones – only was NaCl solution. Composition of initial rocks had not noticeable importance – feldspathoids could appear in cases of using as granodiorite-porphyry so artificial potash feldspar -quartz mixture (where complete replacement of potash feldspar by albite took place). Limestone as well as dolomite can be used as a carbonate rock (pure or with anhydrite admixture).

Feldspathoid zone formation within endomorphic part of columns is a clear example of components differentiation under bimetasomatism (space division of potassium, sodium and calcium and concentration these components in piroxene-potashfeldpar, piroxene-sodalite and piroxene-plagioclase zones accordingly). Metacristals in altered granitoid developed where the composition of plagioclase is rather acid, so the process signifies the culmination of sodium concentration.

Obtained results clearly demonstrate sulpher presence (equally sulphide or sulphate forms) as a favour condition for feldspatiod development.

The appeared mineralisation can be represented as hauyne (sulpher-contained form) so sodalite (quite almost sulpher-absence form).

1. Zaraisky G.P., Zharicov V.A., Stoyanovskaya F.M., Balashov V.N. Experimental investigation of bimetasomatic skarn formation. M.: Nauka, 1986. P.230.

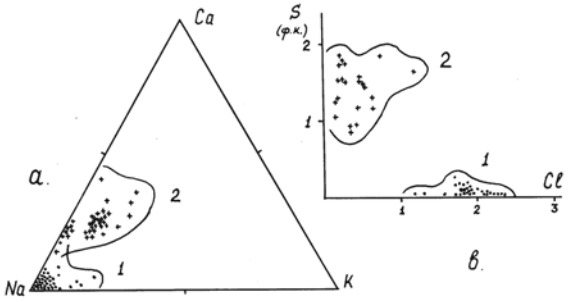

Fig. 1. Ratio of Na, K and Ca, Cl and S contents (in formule indexws) in feldspatoids: 1 – sodalites, 2 – hauynes

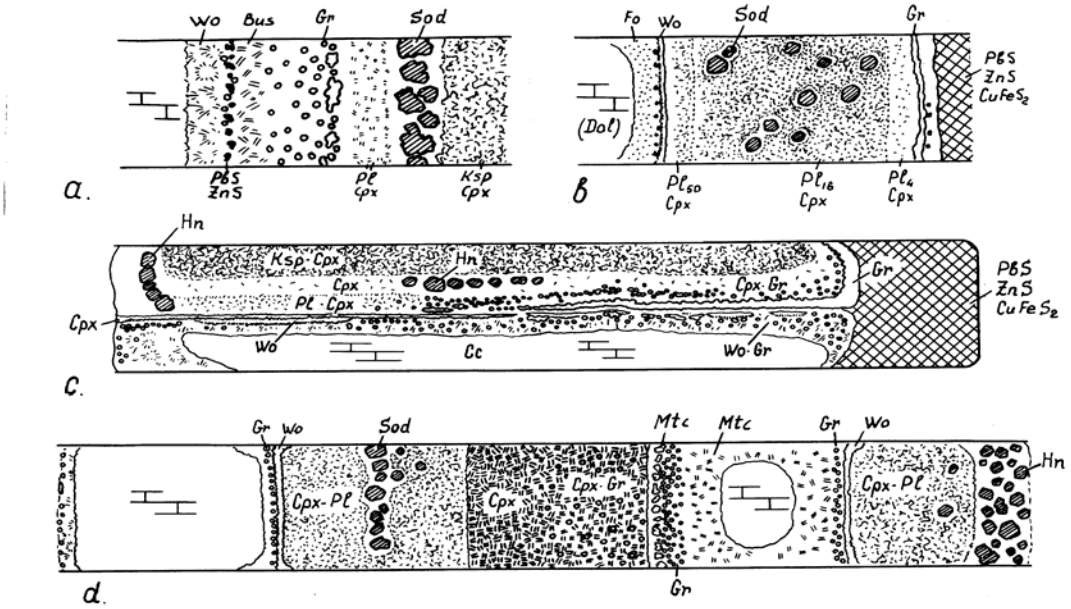

Fig. 2. Different positions of feldspathoid mineralization in the specimens structure. Temperature of the experiments: 550°C (a), 600°C (b,c,d); pressure 1 kbar. Solutions: a – 1,5 m NaCl+KCl (with admixture KF), b, c – 1m NaCl, c – 1m NaCl+KCl. Granodiorite-porphyry was used as a initial silicate rock, limestone (a, c), dolomite (b) and anhidrite-contained limestone (d) as a carbonate one. Minerals' indexes: Bus – bustamite, Cc – calcite, Cpx – clinopyroxene, Fo – forsterite, Gr – garnet, Hn – hauyne, Ksp – potash feldspar, Mtc – monticellite, Pl_{50} – plagioclase (lower index – per cent of anortite), Sod – sodalite, Wo – wollastonite