AT THE OPPORTUNITY OF EXISTENCE OF ARGON MINERALS

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At definition of age of minerals products of radioactive disintegration of some elements are used. Two classes of radiogenic systems are methodically applied: isotope Pb- Pb system both изобарные K-Ar and Rb- Sr- systems. Forms of entry parent (U, K, Rb) and the majority of affiliated elements are known and, as a rule they are mineral- forming elements. For uranium are uranium (uraninite, nasturane, uranium pitch) and uranium- containing (zircon, monazite and so forth) minerals. The prospective form of entry of radiogenic lead is PbO (A.A. Kirkinsky, 1965; S.A. Magomedov, 1970). The form of a presence of the radiogenic argon Ar formed at decay radioactive potassium ^{40}K, is investigated not enough. It is supposed, that Ar can be as an ion. For ionization of Ar atom are necessary big for energy that causes absence of own connections of an element. Its ionization up to Ar^{+1} needs energy in 15 эВ, or about 346,6 kcal/M, up to ion Ar^{+2} - 27,5 эВ (633,4 kcal/M). At the same time for next neon Ne the first potential of ionization is equal 21.56 эВ (V.I.Lebedev, 1957). For inert gases, related Ar- krypton Kr and xenon Xe- these energy has less than inert gases: for Kr^{+1} energy of ionization is equal 14.06 эВ, for Xe^{+1}-12.19 эВ, and they have own forms: - KrF_2, KrF_4, XeF_2, XeF_2, XeF_6, $XeOF_6$, $BaXeO_4$. Ar, Kr and Xe pulls together with each other presence hydraten forms: $Ar*6H_2O$; $Kr*6H_2O$ and $Xe*6H_2O$ (E.K. Gerling, 1961; N.L. Glinka, 1974). The same affinity each other gases is illustrated also by affinity of orbital nuclear radiuses: rAr^o = 0.659; rKr^o = 0.795 and rXe^o = 0.986Å, while rNe^o = 0.354Å. Orbital radius Ar is close to those for K: rK^{+1} = 0.592Å (A.A. Godovikov, 1982). By A.A. Marakushev (1982) electroaffinity (EA) of ions of these elements is expressed by values (in kcal): Ne^{+1}-EA = 237; Ar^{+1}-170; Kr^{+1} - 156; Xe^{+1} - 135; besides Ne^{+2} - 592; Ar^{+2} - 403; Kr^{+2} - 361. Under the power characteristics difference Ar from next Kr is much less, than from next Ne. On these parameters Ar is on such limit, which under favorable conditions can promote formation of own connections including minerals.

The analysis of conditions of radiogenic argon formation shows an opportunity existence of ionized form Ar in minerals. In the first, Ar^{+1} it is formed by natural way at radioactive disintegration. In the second, at occurrence Ar forms the nucleus of feedback having average energy in 100 МэВ (V.M. Ershov, 1974) to which has enough for ionization of atom Ar. In the third, decay of a nucleus ^{40}K is carried out on reaction in which basis lays K- capture electron from an internal electronic orbit by K- atom nucleus. The external electronic orbit some time keeps a structure, which it had in an environment of atom K. In this case ion K^{+1} turns to an ion $^{40}Ar^{+1}$. Therefore the first portions of atoms ^{40}Ar can replace atoms K in minerals that can be promoted by affinity of dimensional parameters of atoms and ions of elements. As at decay of a K- atom nucleus it is formed as well radiogenic calcium Ca^{+1} under favorable conditions then regenerative oxidizingly- reducing reaction $Ar^+ + Ca^+ = Ar^0 + Ca^{++}$ is carried out. Hence, in a lattice of atom there can be two forms of argon: Ar^0 and Ar^{+1}.

One of methods of the analysis of Ar forms is studying of Ar diffusion in minerals. Researches by a fritting method reveal some stages of liberation of gas, which it is conditional grouping in two groups.

Group I- liberation of gas occurs up to T = 300-450^{o}C with activation energy (EA) up to 30-40 kcal/M. Interpretation of these data somewhat is not unequivocal. By E.K.Gerling (1961), this low temperature l group is caused by diffusion on vacancies, and to infringements in a lattice of a mineral. Diffusion is carried out on the mechanism of chemical reaction I-ro of the order, instead of on Arrenius kinetic (E.K.Gerling etc., 1965, H.I.Amirhanov etc., 1959, A.S.Batyrmurzaev, 1982) and does not correspond to the mechanism of ionic conductivity and self-diffusion of positive ions, characteristic for ions K, Na (A.S.Batyrmurzaev, 1982) and lead (S.A.Magomedov, 1971. The analysis of glauconite and muscovite (S.S. Sardarov, 1963) has revealed analogy in the mechanism of allocation Ar and H_2O. It allows to state the assumption, that argon of the first group of allocation is submitted by the neutral form of the argon, moving mainly on defects of a lattice and vacancies with low values EA.

II group is diffusion at temperatures more 500^{o}C up to temperature of fusion (I.M. Morozova etc., 1977, G.S. Ashkinadze etc., 1977). In this group three subgroups with zones of allocation Ar (microcline, orthoclase, biotite, amphibolite) in 600-800^{o}C, 1030-1110 and 1390-1500^{o}C and EA = 50-70 kcal/M are allocated, achieving in biotite and amphibolite 200 kcal/M, and in uraninite- 340 kcal/M (I.M. Morozova

etc., 1977; E.K. Gerling etc., 1966). For comparison we shall note, that for self-diffusion U in UO_2 EA = 104,6 kcal/M (R.Lindner, F.Schmitz, 1961); in xenotime, monacite, brytolite, samarskite EA (Xe) = 120-131 kcal / M (about 65-85 % of gas) (G.S. Ashkinadze 1970). As a whole, the subgroup with EA = 40-70 kcal/M, established in K-forming minerals (orthoclase, microcline, biotite, muscovite and so forth) (R. Freer, 1981 is most distributed; M. Ozima, F.A. Podosek, 1987). On these intervals EA (Ar) are close to those for K.

High values EA can not be explained by action of simple chemical reactions of the first order. These EA values are close energies of crystal lattices (CL) and connections between elements in these lattices. So, energy of chemical connection in pair Si - O is equal 89 kcal/M, Si - H – 75 ккал/M (E.K. Gerling etc., 1955; 1961). Hence, high EA (Ar) reflect energy of chemical communication (connection) Ar in a lattice, and with drawal Ar occurs to break of these connections. It is possible, if laws of formation of CL with Ar participation are observed, and it is possible, if Ar is an element of this CL and enters into it in the ionic form, in particular, replacing in a lattice K.

Life of Ar- minerals can be checked experimentally up at saturation by the ionized argon in melt of K-mineral. Most likely it K-feldspars (concentration K_2O achieves 17 weight. %) or lacite (K_2O = 21,5 weight. %). The main problem can become not ionization Ar, and removal free K.

Electronic Scientific Information Journal "Herald of the Department of Earth Sciences RAS" № 1(21)'2003
Informational Bulletin of the Annual Seminar of Experimental Mineralogy, Petrology and Geochemistry – 2003
URL: http://www.scgis.ru/russian/cp1251/h_dgggms/1-2003/informbul-1_2003/mineral-18e.pdf
Published on July 15, 2003