EXPERIMENTAL STUDY ON MODIFICATION OF ANALZIMOLITES

Kunts A.F. (IG Komi SC UrB RAS)
kunts@geo.komisc.ru, Fax: (8212) 24-53-46; Phone: (8212) 44-60-16

Geological researches of the last decades in many regions of Russia stated a wide development of zeolitic mineralization. Zeolitic sedimentations of carbon, perm and triassic, which occupy more and more teritory, are very important for involving zeolites and zeolite- contained rocks un the sphere of practical usage. Among them analcime-contained rocks ("analcimelite") of the super permic megaformation, to which the carbonate-terrigene formation of the Ufa circle, the terrigene formation of the lower Kazan sublevel, thecarbonate formation of the super Kazan sublevel and the terrigene- carbonate formation of the tatar level, can be mentioned. The quantity of analcime in different types of rocks changes from 20 to 80%. There are three types of analcime: isomeric crystals, micro oolitic concretions and crypto-granular cement in rocks. Analcime-contained sedimentations are spread sometimes for 20-25 meters, and the horizones of superpermic sedimentations with analcime are not situated far from the surface .

Some experimental researches of modification of analcimelites have been carried out by means of melting processes and hydrothermal methods. The results of the experimental researches show that the main phase of the mechanism of zeolitization of sedimentary rocks, made of ash particles and other materials of the volcanic origin, is the interreacting of silica-alumina substratum with pore solutions and the reprecipitation of the dissolved material. In our conditions, taking into consideration the basic mineral association of analcimelites – feldspars, quartz, analcime, the most probable mechanisme of formation of analcime mineralization is a transformation of fieldspates according to this scheme:

$$M^1\ Al\ Si_3O_8 + n\ H_20 \rightarrow Na\ [A1Si_20_6]\text{-}H_20 + SiO_2\ ,\ \text{where } M^1 - \text{Na, K.}$$

The presence of water,the increased alkalinity, and the temperature no more than 350 ^{0}C are necessary conditions for the formation of zeolites. The fact that analcime is usually in a strong association with quartz and it's difficult to get rid of quartz even after the separation of analcime monofraction in heavy liquids can prove this scheme of the analcime formation. In laboratories many zeolites have been synthesized out of natural glasses of different mineral composition. Usually, analcime dominates in the presence of NaOH regardless of the composition of initial glasses.

Some changes of the initial composition of analcimelites (Fig. 1) were stated as a result of their hydrothermal processing in the solutions of various acidity- alkalinity (pH from 3 to 10) under the influence of the temperature 20-350 ^{0}C and the pressure up to 1000 atmospheres.The mineral composition doesn't change considerably.

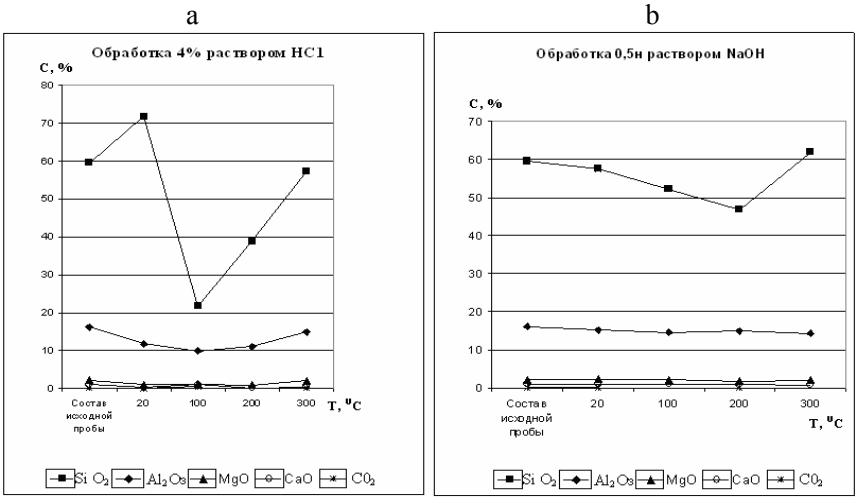

Fig. 1. Changes of the contents of the basic components in analcimelites during the processing in acid (a) and alkaline (b) solutions.

In alkaline solutions partial dissolution of analcime, quartz, and micas occurs; trone, hydrosilicate of calcium, and metasilicate of sodium, which can be found in association with analcime in natural conditions as well, drop out of the solutions. Analcime, stable quartz, feldspar, and mica dissolve under the processing of chlorohydric acid.

New porous materials (Fig. 2) were got during the process of modification of analcimelites under the influence of a hot temperature (up to 1250°C).

a b

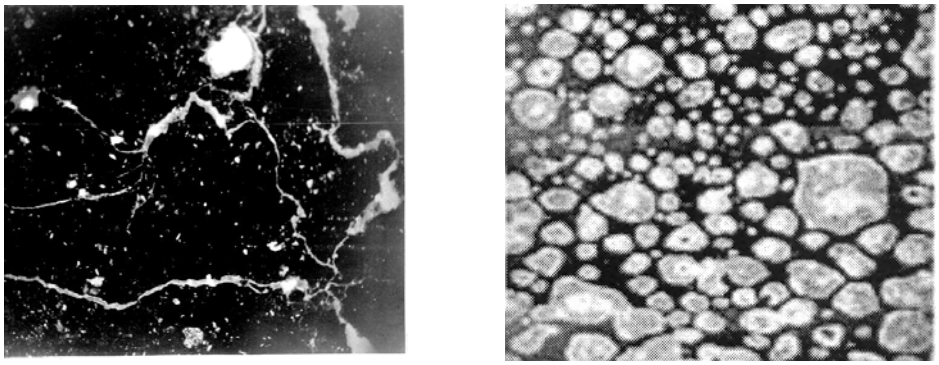

Fig. 2. Initial (a) and transformed (b) analcimelites

In transformed analcimelites porosity is much bigger in comparisson with initial analcimelites (tab. 1).

Table

Sample	Open porosity, %	Water absorption, %	Density apparent, gramme/ centimeter^3	Density gramme/ centimeter^3	Porositygeneral., %
6KP/97-2	4,49	3,56	1,26	2,63	51,9
17KP/97-2	15,14	11,99	1,26	2,65	52,33
21KP/97-2	27,19	21,99	1,24	2,39	48,23
26KP/97-2	38,69	30,27	1,28	2,76	53,72

Their water absorption is sharply increasing, That can be used for making some technological decisions. The sharp increase of the general porosity allowes us to use the received materials for coping with oil pollutions and also for their further modifying by means of hydrothermal methods.

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