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CRYSTAL CHEMISTRY AND THERMODYNAMICS OF STRUCTURAL TRANSFORMATIONS OF SOME LAYER SILICATES UNDER HYDROTHERMAL CONDITIONS

The paper deals with the results of experimental transformation of kaolinite montmorillonite, sepiolite and palygorskite in the presence of Na, K, Ca and Mg chlorides sulphates and carbonates under hydrothermal conditions. The obtained intermediate and final products were examined using X-ray microdiffractometric, eIectron microscopic and infrared spectroscopic methods. It was shown that stability range of mixed-Iayer cIay minerals is typical for intermediate stages of hydrothermal alteration process. The phenomenon of inheritance of structural patterns of initial minerals by new formed phases was observed. P-T-X-pH parameters of some experimentallv checked reactions were calculated by means of thermodynamic methods. Dehydration and dehydration- ionic models of transformation have been proposed. It was found that the latter is more adequate for interpreting the processes studied that the first one. Thermodynamic approach is very suitable in theoretical study of post-diagenetic, hydrothermal-metasomatic and contact matamorphic alteration of layer silicates.

JERZY FIJAŁ, ZENON KŁAPYTA, JANUSZ ZIĘTKIEWICZ, MIECZYSŁAW ŻYŁA

ON THE MECHANISM OF THE MONTMORILLONITE ACID ACTIVATION
I. DEGRADATION OF Ca-MONTMORILLONITE STRUCTURE

The mechanism of the reaction of hydrochloric acid solution with montmorillonite was investigated. The analyses were carried out on Ca-montmorillonite, separated from bentonite from the Chmielnik deposit. 20% HCl solution was used for activation. Changes in the crystalline structure of the mineral were recorded after 1, 3, 4, 5 and 10-hour activation. The process was investigated by X-ray, thermal, infrared spcctroscopic, sorption and chemical analyses. Three fundamental stages of the reaction of HCl solution with montmorillonite were distinguished :

1. Exchange of Ca^{2+} for H_3O^+ ions.
2. Disarrangement of montmorillonite octahedral layer connected with partial removal of Al^{3+}, Mg^{2+} and Fe^{3+} ions and of a small amount of hydroxyl groups. At this stage of degradation, the solid phase still retains the structure of montmorillonite.
3. Degradation of montmorillonite structure connected with a complete decomposition of the octahedral layer and disarrangement of the tetrahedral layer. The process of acid activation tends to the formation of amorphous, porous silica gel. Attention was paid to the remarkable

influence of Ca^{2+} ions on the course of acid activation process and sorption properties of the degraded montmorillonite samples.

JERZY MEJSNER

ONE-DIMENSIONAL ELECTRON DENSITY FUNCTION OF MONTMORILLONITE FROM MILOWICE (UPPER SILESIAN COAL BASIN)

For a Milowice montmorillonite, one-dimensional electron density function r (x) was calculated along the normal to the (001) plane. Results were compared with the r (x) function calculated from the Hofman et al. 1933 theoretical model of montmorillonite. The effect of the number of Fourier coefficients added on peak resolution and on the agreement of peak height in the r (x) function with the theorctical electron density of atomic planes in montmorillonite has been discussed.

ŁUKASZ KARWOWSKI ANDRZEJ KOZŁOWSKI

TEMPERATURE, PRESSURE AND COMPOSITION OF THE PARENT SOLUTIONS OF QUARTZ FROM JEGŁOWA, LOWER SILESIA

The present paper is an attempt at elucidating the genesis of rock crystal occurring in the kaolinite rock at Jegłowa, Lower Silesia. The temperatures of quartz crystal formation vary in the range 350 -120° C. Upon the determination of the chemical composition of the parent solutions it has been found that Na^{+} ,Ca^{2+}, K^{+}, Al^{3+} and Cl^{-} were the principal ions. The mean concentration of the solutions was 18 weight per cent. The probable pressure during the crystallization of quartz from these solutions attained a value of 500-600 atm (for the temperature 220 -160° C).

LESZEK STOCH, EDELTRAUDA HELIOS-RYBICKA

ON DESINTEGRATION OF QUARTZ DURING WEATHERING PROCESS OF GRANITIC ROCKS

Changes in microtexture surface of quartz grains and in grain-size distribution of quartz in weathering crust were examined. These phenomena were caused by chemical dissolution of quartz during kaolinization of granitic rocks. Grain-size distribution of quartz in parent granitic rocks was found to be lognormal, truncated on both sides. During weathering, dispersion of grain-size distribution and the mean size of quartz grains are slightly increased.

BRONISŁAWA KORCZYŃSKA-OSZACKA

THE OCCURRENCE OF α -$MnSiO_3$ IN THE MANGANESE-BEARING ROCKS OR THE TATRA MOUNTAINS

Manganese-bearing rocks occurring in the upper par of the Liassic crinoidal limestones in the Chochołowska Valley in the Tatra Mts. underwent silification. This process gives rise to manganese silicate. The chemical and X-ray analyses have shown that it is a -$MnSiO_3$ unown in nature. Liebau et al. (1958) obtained this modification by synthesis and demonstrated that it has the structure of triclinic, pseudohexagonal pseudowollastonite $Ca_3[Si_3O_9]$ with the ring structure of the silico-oxygen anion.

JÓZEF NEDOMA

A GENERALIZED MATRIX OF SYMMETRY ELEMENTS

Each point symmetry operation can be described with an abbreviated symbol a (D,M,N,P) in which
a - angle of rotation (also 0° in the case of mirror planes)
D - +1 for a simple axis, -1 for a mirror axis
MNP coordinates of a point in space fulfilling the condition

$$M^2+N^2+P^2=1$$

The paper contains a generalized matrix, the elements of which can be easily calculated from data contained in the abbreviated symbol. Formulae for deciphering each given matrix and for writing it in the form of the abbreviated symboI are also given.

JANUSZ DOMINIK ANTONI SIWIEC

POLYGRADIENT ELECTROMAGNETIC SRPARATION OF CHLORITES FROM SHALES

The paper presents a method of separation of chlorites from shales by means of polygradient electromagnetic separator. Best results were achieved when grooved plates were placed in the magnetic field and grains above 10mm in size were separated from the suspension. A concentrate with about 80% content of chlorites was obtained.