

layers and motive of their interstratifications have been defined.

The established crystallochemical features and the regularities in distribution of clay minerals allowed decompaction zones at significant depths to be found out and the character as well as the degree of epigenetic transformations of Triassic rocks of West Siberian Plate penetrated by TCG-6 well to be refined.

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**PS08.02.17 CRYSTAL-CHEMICAL STUDY OF  $\text{KAISi}_3\text{O}_8$ - $\text{KFeSi}_3\text{O}_8$  SOLID SOLUTION SERIES.** V.K. Taroev<sup>1</sup>, V.L. Tauson<sup>1</sup>, H. Kroll<sup>2</sup>, J. Gottlicher<sup>3</sup>. <sup>1</sup>Institute of Geochemistry, Irkutsk, 664033, Russia; <sup>2</sup>Institute of Experimental Mineralogy, Munster Univ., D-48149, Germany; <sup>3</sup>Institute of Technical Mineralogy, Karlsruhe, D-76021, Germany

The monoclinic mixed crystals  $\text{K}(\text{Fe,Al})\text{Si}_3\text{O}_8$  are synthesized under hydrothermal conditions from pure oxides in KOH solution at temperatures 500 and 600°C and pressure ca. 100 MPa. The mixed crystals up to 2 mm were obtained. An extensive formation of solid solution was observed only under sufficiently high oxygen fugacities corresponding to Cu-Cu<sub>2</sub>O buffer assemblage (up to 60 mole per cent of  $\text{KFeSi}_3\text{O}_8$ ). The unit cell edges vs. mole fraction graphs are close to linearity, their extrapolation to monoclinic end member agrees well with the data available from the literature. Both the Mossbauer spectroscopy and X-ray structure refinement studies indicate the absence of Fe<sup>2+</sup> species, and preferential occupancy of T1 position by Fe<sup>3+</sup> and Al<sup>3+</sup> in the proportion of their bulk concentrations. The data obtained are in poor agreement with the well-known Eberhard's solvus for monoclinic Al-Fe - potassium feldspar (Eberhard, 1965). The discrepancy may be explained by the dispersed state of phases in Eberhard's experiments, and so, the possibility of crystallite size effect (Tauson & Akimov, 1993) or the absence of oxygen fugacity control.

References:

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**PS08.02.18 TRANSFORMATIONS OF CUBIC LAZURITE WITH INCOMMENSURATE-MODULATED STRUCTURE.** V.L. Tauson, A.N. Sapozhnikov, K.E. Kuznetsov, and V.V. Akimov, Institute of Geochemistry, Irkutsk, 664033, Russia

The sodalite-like minerals are the convenient object for studying different types of structure modulations, especially that ones which can be considered as the result of forced equilibria attainment (Tauson & Akimov, 1993;1994). The set of experiments is performed using lazurite sample of composition  $(\text{Na,Ca})_{7-8}\text{Si}_6\text{Al}_6\text{O}_{24}(\text{SO}_4,\text{S,Cl})_2$  from the Baikal region deposit. The sample is characterized with the three-dimensional incommensurate modulation of structure with the modulation parameter  $n=0.217$ . When annealed in air, the sample changes the initial modulation to the commensurate one with  $n=0.168$  via an intermediate state without superstructure. The diagrams of lazurite stability on coordinates temperature-gas fugacity ( $T$ - $f\text{O}_2$ ,  $T$ - $f\text{S}_2$ ,  $T$ - $f\text{SO}_2$ ) are obtained. Lazurite is unstable under  $f\text{O}_2 > 10^{-14}$ - $10^{-12}$  bars and decomposes with the formation of complex sulphates of Ca, Na and Al which are qualitatively similar to the clusters observed in lazurite and hauyne structures. However, the actual reason of lazurite instability lies in the high  $f\text{SO}_2$ , not high  $f\text{O}_2$  value. Under a sufficiently low  $f\text{SO}_2$ , lazurite undergoes the transformation to the sulfide sodalite because the  $\text{SO}_4$  - ion loses its stability. This is accompanied by a strong contraction of the lazurite lattice. Under very low  $f\text{SO}_2$  ( $< 10^{-14}$  bar) at 550°C, a new phase with incommensurate modulation  $n=0.136$  is observed in addition to S-sodalite. For moderate  $f\text{SO}_2$  values, the ordering and condensation of clusters occur before lazurite decomposition. As a result, a persistent density modulation is formed which originates from the balance of cluster ordering energy and Na-Ca mixing energy because the formation of cluster condensates needs

a local change in solid solution composition for its accommodation to the clusters stoichiometry. This state is recognized as metastable forced equilibrium of type II.

References

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**PS08.02.19 THE INFLUENCE OF COMPOSITION AND EXTERNAL ACTIONS ON MICA CRYSTALS STRUCTURE.** V. V. Voyna, V.A. Liopo, Phys. & Engin. Dept., Grodno State University, Grodno, BELARUS. 230023

Structural variations of the mica crystals with different degrees of hydration (G) in the processes of heating and mechanical deformations were studied. The G-values of phlogopite (Ph) crystals, their interplanar distances [ $d=d(00l)$ ], the relative K-maximum altitude on Z-projection of electron density (Z), the IR-absorption factor for 3550  $\text{cm}^{-1}$  (A), concentrations of 14 Å layer (W), microhardnesses (H) are bounded by relations  $G \sim d \sim Z^1 A \sim W \sim H^1$ . Symmetries of the thermal expansion tensor and the tensor of elasticity for trioctahedral Ph and dioctahedral muscovite (M) were  $\infty/mmm$  and  $mmm$  respectively. The ratios of major axes of these tensors are determined. The scheme of the thermic destruction for different mica crystals was investigated. The measure of crystal defectivity is a ratio of structural deformation to the macro ones when external forces are the same. The structural variations in the heating and strain processes for mica crystals with different hydration degrees are the biggest ones in the interlayer interval. The changes of geometrical sizes of the structural polyhedrons and their turnings at heating depend on the crystal composition and external forces. The principal differences between the tri- and dioctahedral micas (Ph and M in our case) crystals structural variations in the processes of heating and strain are determined by possibility of trioctahedral mica to form mixed-layer structures.

**PR08.02.20 THE CRYSTAL STRUCTURE OF SCOMIOKITE-(Y),  $\text{Na}_3\text{Y}(\text{CO}_3)_3\text{3H}_2\text{O}$ .** Pushcharovsky, Dmitry Yu.<sup>1</sup>, Rastsvetneva, Ramisa K<sup>2</sup>, Pekov, I.V.<sup>1</sup>, <sup>1</sup>Department of Geology, Moscow State University, 119899 Moscow, Russia; <sup>2</sup>Institute of Crystallography RAN, 117333 Moscow, Russia

Among 11 carbonate minerals, which contain Y atoms in the individual positions, schomiokite-(Y),  $\text{Na}_3\text{Y}(\text{CO}_3)_3\text{3H}_2\text{O}$ , is chemically related to orthorhombic tengerite  $\text{Y}_2(\text{CO}_3)_3\text{2-3H}_2\text{O}$ , kimuraite  $\text{CaY}_2(\text{CO}_3)_4\text{6H}_2\text{O}$ , lokkaite  $\text{CaY}_4(\text{CO}_3)_7\text{9H}_2\text{O}$  and tetragonal kamphaugite-(Y)  $\text{CaY}(\text{CO}_3)_2(\text{OH})\text{H}_2\text{O}$ . The aim of the present study is to determine the position of schomiokite inside of this crystal chemical family.

The parameters of the orthorhombic cell are:  $a=17.358$ ,  $b=10.034$ ,  $c=5.946\text{Å}$ , sp. gr.  $\text{Pha}2_1$ . The structure was refined up to  $R_{\text{hkl}} 0.059$  for 1973 observed reflections. The structure contains isolated mixed complexes, formed by  $\text{YO}_9$  polyhedra, which share their three edges with  $\text{CO}_3$  groups.  $\text{YO}_9$  polyhedra can be considered as 3-caped pseudotrigonal antiprisms, where one base is formed by three  $\text{H}_2\text{O}$  molecules. Three  $\text{CO}_3$  groups are characterized by pyramidal distortion with the deviations of C atoms from the planes, formed by O atoms, 0.006, 0.003 and 0.01Å respectively.

The mixed complexes are considered as relicts of the corrugated polyhedral layers, described in tengerite, kimuraite and lokkaite, and are connected by Na octahedra and 5-fold polyhedra as well as by a system of H-bonds. The interpretation of the structure in terms of the interrupted layers is confirmed by the values of its lattice parameters  $\sim 6$  and  $10\text{Å}$ , which are parallel to the plane of the sheet and are close to the corresponding values of tengerite, kimuraite and lokkaite.