

# CONTENTS

## Problems of Planetology, Cosmochemistry and Meteoritics 5

Alexeev V.A., Pavlova T.A., Kalinina G.K. Some features of the radiation history of ureilites.....	5
Badekha <sup>1</sup> K. A., Grokhovsky <sup>2</sup> V.I. Phase transformation in the mono crystals of meteoritic and laboratory origin. UDC 669.017.3 .....	8
Barenbaum A.A. <sup>1</sup> , Shpekin M.I. <sup>2</sup> Cumulative hypothesis of formation on the moon of the south pole-aitken basin by galactic comets UDC: 550.2: 523.4-1/-8 .....	11
Barenbaum A.A. <sup>1</sup> , Titorenko A. <sup>2</sup> Optimized galactic model of geological cyclicity and its testing on geology and astronomy data UDC 550.93, 551.7, 523.525, 524.66 .....	15
Fisenko A.V., Semjonova L.F. Alternative composition of xenon components in nanodiamonds of meteorites. UDC 550.42 .....	19
Ivanov A.A., Sevastyanov V.S., Shnykin B.A., Dolgonosov A.A., Krivenko A.P., Priymak S.V., Galimov E.M. Evaluation of the various energy sources effectiveness at the stage of prebiological structures formation during abiogenesis. UDC 550.47 .....	23
Kuyunko N.S., Alexeev V.A. Thermoluminescent research and determination of metamorphism degree of carbonaceous CO and CV group chondrites.....	25
Lavrentjeva Z.A., Lyul A.Yu. To question about formation of the pallasite parent bodies: on the peculiarities of trace element composition of mineral components from the omolon pallasite.....	28
Lyul A.Yu., Lavrentjeva Z.A. On an influence of the metamorphic processes on siderophile element distributions between the major components of the h-group of ordinary chondrites.....	31
Nikitin S.M. <sup>1</sup> , Gorbatshevich F.F. <sup>2</sup> , Skripnik A.Ya. <sup>3</sup> , Beltyukov N.A. <sup>4</sup> , Morozov I.A. <sup>4</sup> Brittle fracture features of terrestrial analogues of ordinary chondrites components under volumetric compression .....	33
Shornikov S. I. <sup>1</sup> , Yakovlev O. I. <sup>1</sup> The chemical fractionation of perovskite at evaporation .....	36
Tselmovich V.A. <sup>1</sup> , Maxe L.P. <sup>2</sup> Microstructure and composition of particles of native iron of cosmic origin UDC 523.68140 .....	43
Yurkovets V.P. General morphological features of some fragments of the Ladoga space body UDC 551.4:552.6 .....	43
Zharkova E.V., Lukanin O.A., Tsekhonina T.I., Senin V.G. Intrinsic oxygen fugacity measurements of impact glasses from impact craters El'gygytgyn (Chukotka, Russia) and Zhamanshin (Kazakhstan) UDC 550.843 (543.559) .....	45

## Mineral equilibria at high PT-parameters 50

Bulatov V.K. <sup>1,3</sup> , Girmis A.V. <sup>2,3</sup> , Brey G.P. <sup>3</sup> , Woodland A. <sup>3</sup> , Höfer H. <sup>3</sup> Ferropericlasite crystallization under upper mantle conditions.....	50
Fedkin V.V., Sipavina L.V. Clinopyroxene in the eclogite-blueschist complexes: structural signs of the conditions of its formation UDC 549.6+552.16:552.48.....	54
Gorbachev N.S., Kostyuk A.V., Nekrasov A.N., Gorbachev P. N., Sultanov D.M. The interaction of phlogopite with carbonate at $P = 4$ GPa, $T = 1200-1300$ °C: phase relationships and stability of phlogopite. UDC 550.4.02 .....	58
Gorbachev N.S., Kostyuk A.V., Gorbachev P.N., Sultanov D.M. Distribution of elements between phlogopite and carbonate at $P = 2.8$ GPa, $T = 1250$ °C. UDC 550.4.02.....	61
Iskrina A.V. <sup>1,2</sup> , Spivak A.V. <sup>2</sup> , Bobrov A.V. <sup>1,2,3</sup> , Dubrovinsky L.S. <sup>4</sup> , Eremin N.N. <sup>1</sup> , Marchenko E.I. <sup>1</sup> . Experimental study of calcium-ferrite structure type phases in the mg-al-cr-o system at conditions of the earth's transition zone and lower mantle UDC 549.02 .....	63
Kogarko L.N. Crystallization of alkaline phosphates from magmatic melt. UDC 553.491.8:549.271(571.5).....	65
Kostyuk A.V., Gorbachev N.S., Sultanov D.M., Nekrasov A.N. Experimental investigation of peridotite-basalt- $(K, Na)_2CO_3-H_2O$ system at $P = 4$ GPa, $T = 1400$ °C: phase composition and critical relationship between melt and fluid. UDC 550.4.02 .....	68

## Thermodynamic properties of minerals and fluids 72

Korepanov Ya.I., Osadchii E.G. Thermodynamic properties of Ag-Au alloy with high concentration of silver ( $0.9 < x < 1$ $Ag_xAu_{1-x}$ ).....	72
Shornikov S. I. <sup>1</sup> , Ivanova M.A. <sup>1</sup> , Minaeva M. S. <sup>2</sup> Thermodynamic properties of the MgO – FeO melts .....	74
Shornikov S. I. Thermodynamic properties of the CaO–MgO melts .....	77

## Synthesis of minerals 81

- Gurbanova O.A.<sup>1</sup>, Evdokimov A.I.<sup>1</sup>, Antipin A.M.<sup>2</sup>, Volkov A.S.<sup>1</sup>, Khasanova S.<sup>3</sup>, Dimitrova O.V.<sup>1</sup> Hydrothermal synthesis and crystal structure of a new orthophosphate of lithium, aluminum, copper and iron. UDC 548.736..... 81
- Kovalskaya T.N.<sup>1</sup>, Ermolaeva V.N.<sup>1</sup>, Varlamov D.A.<sup>1</sup>, Kalinin G.M.<sup>1</sup>, Kovalskiy G.A.<sup>1,2</sup>, Chaychuk K.D.<sup>1</sup> Synthesis of eudialyte from alkaline pegmatites. Preliminary data. .... 82

## Hydrothermal equilibria and ore formation 85

- Alekseyev V.A., Burmistrov A.A., Gromiak I.N. Quartz dissolution in water vapor and solution distillation in quartz–water–vapor system at 300°C..... 85
- Balitsky V.S., Balitskaya L.V., Golunova M.A., Setkova T.V., Bublikova T.M. New experimental data on phase transformations and states of synthetic water-hydrocarbon inclusions in quartz ..... 88
- Bublikova T.M., Setkova T.V., Balitsky V.S. Theoretical study of the solubility of basic copper carbonates in ammonium chloride systems ..... 91
- Korzhinskaya V.S., Kotova N.P. Temperature effect on the behavior of Ta and Nb during the dissolution OF pyrochlore, tantalite,  $\beta$ -Ta<sub>2</sub>O<sub>5</sub> and  $\beta$ -Nb<sub>2</sub>O<sub>5</sub> in (HF+HCl) solutions..... 93
- Kotelnikov A.R.<sup>1</sup>, Damdinov B.B.<sup>2</sup>, Damdinova L.B.<sup>2</sup>, Bryanskiy N.V.<sup>3</sup>, Akhmedzhanova G.M.<sup>1</sup>, Suk N.I.<sup>1</sup> Synthetic fluid inclusions in quartz: a check for the adequacy of capture of ore elements. UDC 550.4.02 ..... 95
- Kotelnikov A.R.<sup>1</sup>, Suk N.I.<sup>1</sup>, Kotelnikova Z.A.<sup>1,2</sup>, Korzhinskaya V.S. Fluids in equilibrium with silicate substance and problems of ore genesis UDC 550.89:553.062..... 97
- Redkin A.F. Tungsten valence in hydrothermal solutions on the experimental and calculated data. .... 98
- Sidkina E.S.<sup>1</sup>, Mironenko M.V.<sup>1</sup>, Polyakov V.B.<sup>2</sup> Calculation of serpentinization of olivin. Verification of the equilibrium-kinetic model. .... 100

## The formation and differentiation of magmas 105

- Bortnikov N.S.<sup>1</sup>, Kryazhev S.G.<sup>2</sup>, Gorelikova N.V.<sup>1</sup>, Smirnov S.Z.<sup>3</sup>, Gonevchuk V.G.<sup>4</sup>, Semenyak B.I.<sup>4</sup>, Dubinina E.O.<sup>1</sup>, Sokolova E.N.<sup>3</sup> The fluid regime of Badzhal hydrothermal-magmatic system of the Far East (Priamurie, Russia)..... 105
- Persikov E.S., Bukhtiyarov P.G., Shekleina M.D. Features of basalt melt crystallization at moderate hydrogen pressures (preliminary results). .... 111
- Rusak A.A.<sup>1</sup>, Shehekina T.I.<sup>2</sup>, Alferyeva Ya.O.<sup>2</sup>, Gramenitskiy Eu.N.<sup>2</sup>, Zinovieva N.G.<sup>2</sup>, Khvostikov V.A.<sup>3</sup>, Kotelnikov A.R.<sup>4</sup> Features of phase crystallization in a high-fluorine model granite system at a temperature drop from 700 TO 400 °C and a pressure of 1 kbar UDC 552.11, 550.42. .... 114
- Tobelko D.P.<sup>1</sup>, Portnyagin M.V.<sup>1,2</sup>, Krashennikov S.P.<sup>1</sup> Complex methodology for estimating the primary H<sub>2</sub>O content in island-arc magmas (the case of Kamchatka)..... 117

## Physical chemical properties of geomaterials 120

- Setkova T.V.<sup>1</sup>, Spivak A.V.<sup>1</sup>, Zakharchenko E.S.<sup>1</sup>, Borovikova A.Yu.<sup>2</sup>, Nesterova V.A.<sup>1,2</sup>, Balitsky V.S.<sup>1</sup>, Bublikova T.M.<sup>1</sup>, Pushcharovsky D.Yu.<sup>2</sup> Raman spectroscopy of synthetic Ga,Ge-rich tourmaline at high pressure up to 30 Gpa (preliminary data)..... 120
- Zharikov A.V.<sup>1</sup>, Lebedev E.B.<sup>2</sup>, Rodkin M.V.<sup>3</sup> Anomalies of rock physical properties due to phase transitions and their possible role in seismotectonic processes..... 121

## Experimental geocology 126

- Grishantseva E.S.<sup>1\*</sup>, Alekhin Yu.V.<sup>1</sup>, Drozdova O.Yu.<sup>1</sup>, Demin V.V.<sup>2</sup>, Zavgorodnyaya Y.A.<sup>2</sup> Experimental studies of organic matter in natural waters of lakes in Vladimir region using a set of analytical methods. UDC 550.4.02 ..... 126
- Salavatova D.S., Fiaizullina R.V., Bychkov D.A. Adsorption extraction of mercury ions from an aqueous solution by rocks of the Maykop series. UDC 550.424: 550.4.02: 550.41: 550.42 ..... 129

## Engineering of experiment 133

# CONTENTS

Chertkova N.V. <sup>1</sup> , Spivak A.V. <sup>1</sup> , Zakharchenko E.S. <sup>1,2</sup> , Litvin Y.A. <sup>1</sup> , Kuzyura A.V. <sup>1</sup> , Safonov O.G. <sup>1</sup> , Efimchenko V.S. <sup>2</sup> , Meletov K.P. <sup>1,2</sup> . A refinement of the externally heated diamond anvil cell technique for laboratory applications, UDC 53.086; 608.2; 543.424.2 .....	133
Lakshantov L.Z., Karaseva O.N. Study of the mechanisms of chalk recrystallization. UDC 550.4.02 .....	134
Molchanov <sup>1</sup> V.P., Medkov <sup>2</sup> M.A. Ways of industrial development of gold-ilmenite placers of the sikhote-alin with the use of pyro- hydrometallurgical methods .....	137

## Interaction in the systems of fluid–melt–crystal 140

Alferyeva Ya.O., Novikova A.S., Gramenitskiy E.N. Interaction of fluorine-containing granite melt and calcite as a possible cause of formation of high-calcium ongonites. UDC 552.113 .....	140
Bychkov D.A., Koptev-Dvornikov E.V., Romanova E.S. Verification of the system of thermobarometers-compositometers on experimental and natural material. UDC 552.111: 550.41 .....	141
Chevychelov V.Yu. On the solubility of ferrotapiolite and nb/ta ratios in model high-aluminous, subaluminous and alkaline granitoid melts UDC 550.42 .....	144
Chevychelov V.Yu., Viryus A.A. Solubility of ilmenorutile in model granitoid melts at various alkalinity–alumina. UDC 550.42 .....	147
Khodorevskaya L.I. Experimental modelling of alkaline metasomatism under pressure gradient conditions at 750°C. UDC 553.065.1 .....	149
Koptev-Dvornikov E.V., Romanova E.S., Bychkov D.A. Orthopyroxene liquidus thermobarometer-compositometer for a range of melt compositions from magnesian basites to dacites .....	152
Kotelnikov A.R., Korzhinskaya V.S., Suk N.I., Van K.V. Experimental study of zircon and hafnon solubility in silicate melts UDC 550.89 .....	155
Kotelnikov A.R. <sup>1</sup> , Suk N.I. <sup>1</sup> Damdinov B.B. <sup>2</sup> , Damdinova L.B. <sup>2</sup> , Khubanov V.B. <sup>2</sup> Experimental studies of phenakite solubility in silicate melts UDC 550.89 .....	158
Novikova A.S., Alferyeva Ya. O., Gramenitskiy E.N. Phase relationship modelling in syrostan massive near-contact zone by 1 kbar and 900 and 850 °C. UDC 552.113 .....	159
Romanova E.S., Koptev-Dvornikov E.V., Bychkov D.A. Pigeonite liquidus thermobarometer for a range of melts compositions from magnesian basites to dacites. UDC 552.111: 550.41 .....	161
Seliutina N.E. <sup>1,2</sup> , Safonov O.G. <sup>2,1</sup> , Varlamov D.A. <sup>2</sup> Petrological and experimental study of syenitization of tonalite gneisses exemplified by the midiapala massif, limpopo complex, South Africa. UDC 552.11 .....	164
Shchekina T.I. <sup>1</sup> , Zinovieva N.G. <sup>1</sup> , Rusak A.A. <sup>2</sup> , Khvostikov V.A. <sup>3</sup> , Gramenitskiy E.N. <sup>1</sup> , Alferyeva Ya.O. <sup>1</sup> , Kotelnikov A.R. <sup>4</sup> Particularities of scandium distribution between silicate and salt melts and crystal phases in the Si-Al-Na-K-Li-F-O-H system AT 800°-500°C and 1 kbar. UDC 552.11, 550.42 .....	166
Suk N.I., Kotelnikov A.R., Viryus A.A. Experimental studies of loparite solubility in silicate melts .....	169

## AUTHORS INDEX 172